

Technical Catalogue

A large, stylized graphic in the bottom left corner, consisting of a white arrow pointing right and a red arrow pointing left, both set against a red background.

FIRE VENTILATION SYSTEMS
FIRE DAMPERS AND FIRE VALVES



Fire ventilation systems Technical Catalogue 2022
Edited by: "MERCOR" S.A. - Fire Ventilation Systems Department Team

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FIRE DAMPERS & SMOKE CONTROL DAMPERS AND FIRE VALVES

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Technical Catalogue

2022

Dear Customers!

Below you will find our Technical Catalogue for fire ventilation systems, which contains detailed information on the application, design, versions, manufacturing options and equipment, methods of installation and technical parameters of our fire dampers and valves.

Every device dispatched from the „MERCOR“ S.A. manufacturing plants 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

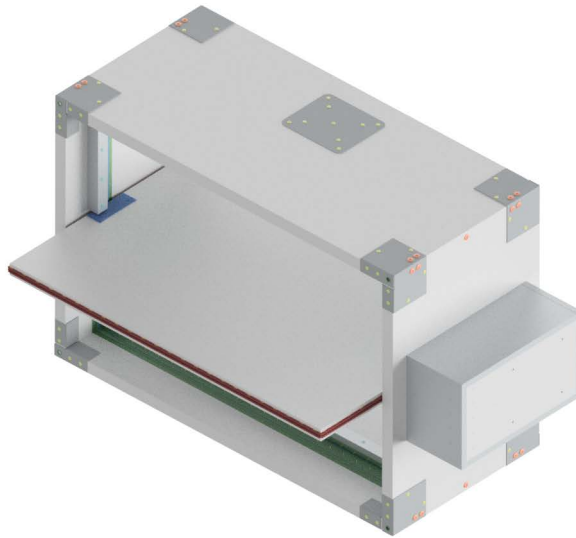
The electronic version
of our Technical Catalogue
is available at www.mercor.com.pl



mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems



downloadable models on the website under the designer zone tab

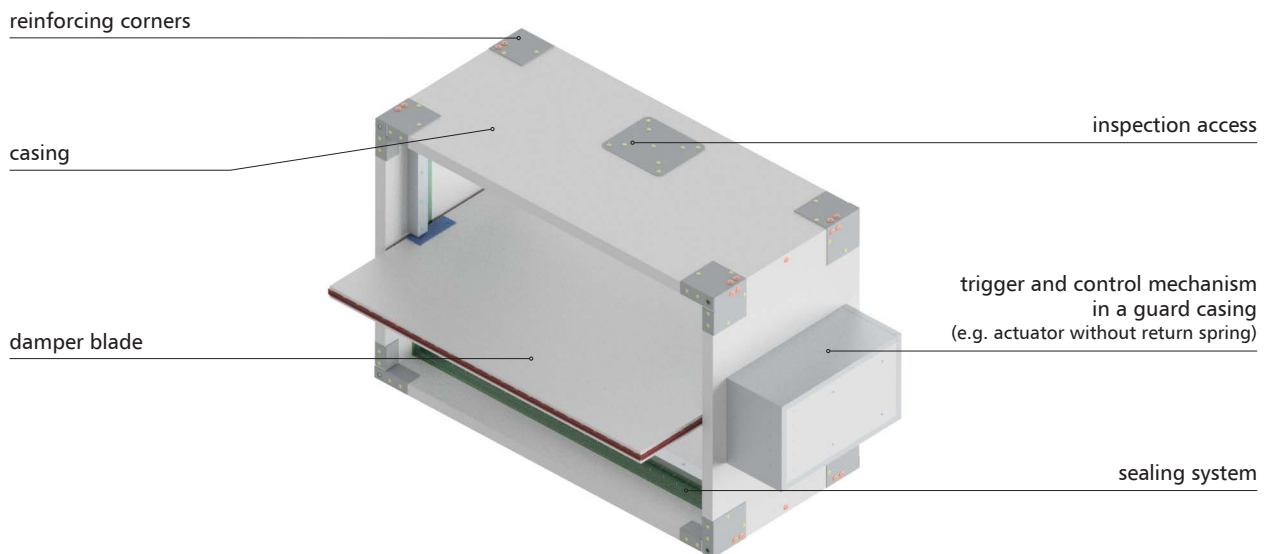


- » **EIS120, E₆₀₀ 120**
- » Fire resistance class: EI120 ($v_{ed} h_{od} i \leftrightarrow o$)S1500C₁₀₀₀₀MAmulti.
- » Certificate of constancy of performance 2434-CPR-0031. Dampers certified for compliance with EN 12101-8.
- » Dampers rated under EN 13501-4 and tested under EN 1366-10.
- » Smoke control dampers resistance independent of airflow direction and installation side.
- » Lower acoustic noise and hydraulic resistance in the system achieved through a reduction of damper blade thickness (40 mm for EIS120).
- » MA feature (the damper blade can change its position during a fire).

1.1 | Application

The mcr FID B smoke control dampers are intended for installation in manually or automatically operated fire ventilation systems. mcr FID B dampers are used in fire ventilation systems or in mixed fire and comfort ventilation systems. When installed, these devices prevent the propagation of fire, smoke and fire gases to adjacent areas. Admissible flow velocity in the connected duct is 12 m/s. During normal operation, the fire damper blade is in the open or closed position, depending on its function. The fire damper blade in the fire compartment is opened, whereas in other areas the blades remain closed. The damper blade may change its position during a fire (MA feature), depending on the needs of the rescue teams and the fire scenario.

1.2 | Design

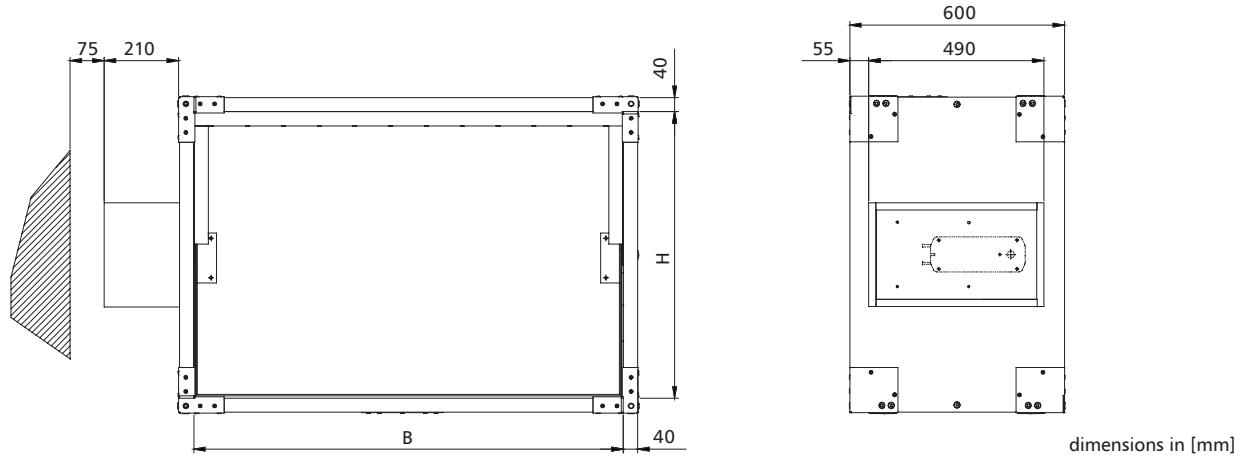


mcr FID B smoke control dampers consist of a casing with a rectangular cross-section composed of fire-proof boards, a moving damper blade and an actuator, which is activated remotely. Special design casing with impregnated fire-proof boards are used in chemically aggressive environments. The casing total length is 600 mm. The damper blade is made of a fire-proof panel with the total thickness of 40 mm. The inner side of the fire damper casing is equipped with a sealing system. Stop profiles are attached to the inner casing surface, limiting the rotating motion of the damper blade. As a standard, the damper is equipped with an inspection access, located on one of the sides of the damper. At the corners of the casing, there are steel reinforcements with a rivet nut system, enabling the installation of masking grilles and frames for connecting steel ventilation ducts.

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

1.3 | Versions

1.3.1 | Closing and opening with an actuator



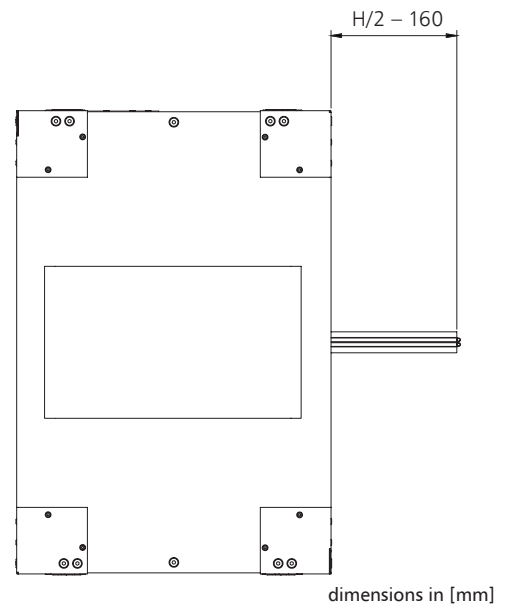
During normal operation, the damper blade of the fire damper remains open or closed. In the case of fire, the damper blade in the compartment where the fire occurs opens and the damper blades in the remaining compartments are closed – the blades are operated remotely by supplying power. The mcr FID B dampers are equipped with a trigger and control mechanism in the form of a BE, BEE or BEN series axial actuator, supplied with 24 V AC/DC or 230 V AC voltage. Actuators are equipped with limit switches used to monitor the position of the damper blade. Dampers with BE, BEE or BEN actuators can be opened/closed by supplying voltage to the actuator terminals.

1.4 | Dimensions

rectangular dampers:

- » nominal width B: from 200 mm to 1200 mm
- » nominal height H: from 200 mm to 800 mm
- » maximum single damper cross-section surface up to 0.96 m²
- » the design of the damper ensures that its damper blade, regardless of the dimensions of the BxH damper, does not protrude beyond the device casing on one side.

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



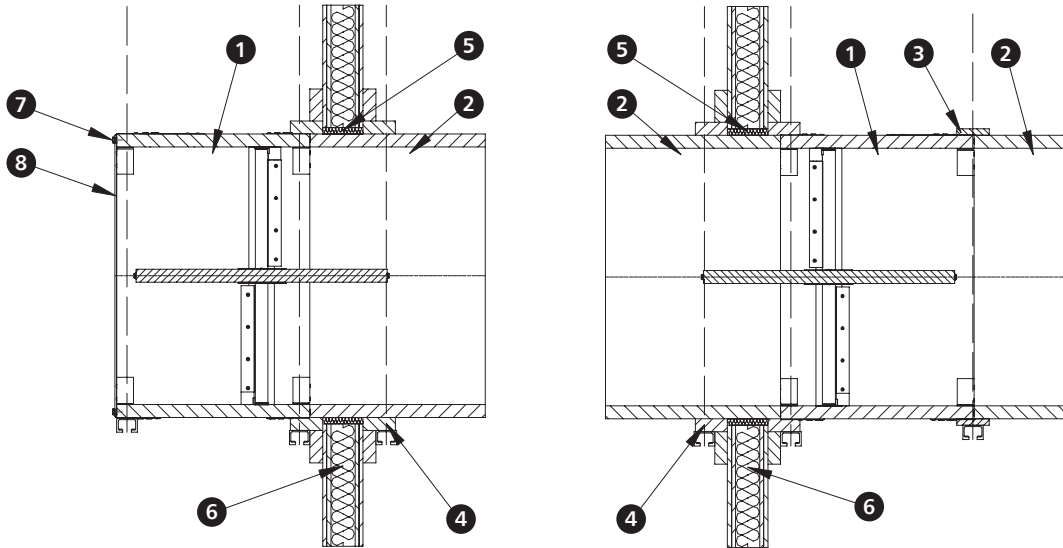
mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

1.5 | Installation

The mcr FID B rectangular dampers are rated as EI120(v_{ed} h_{od} i↔o)S1500C_{10,000} MA multi if installed on fireproof ducts rated according to EN 1366-8 and EN 1366-9.

The mcr FID B rectangular dampers are rated E₆₀₀ 120 (v_{ed} i↔o)S1500 C_{10,000} MA single in single-zone fire ventilation systems.

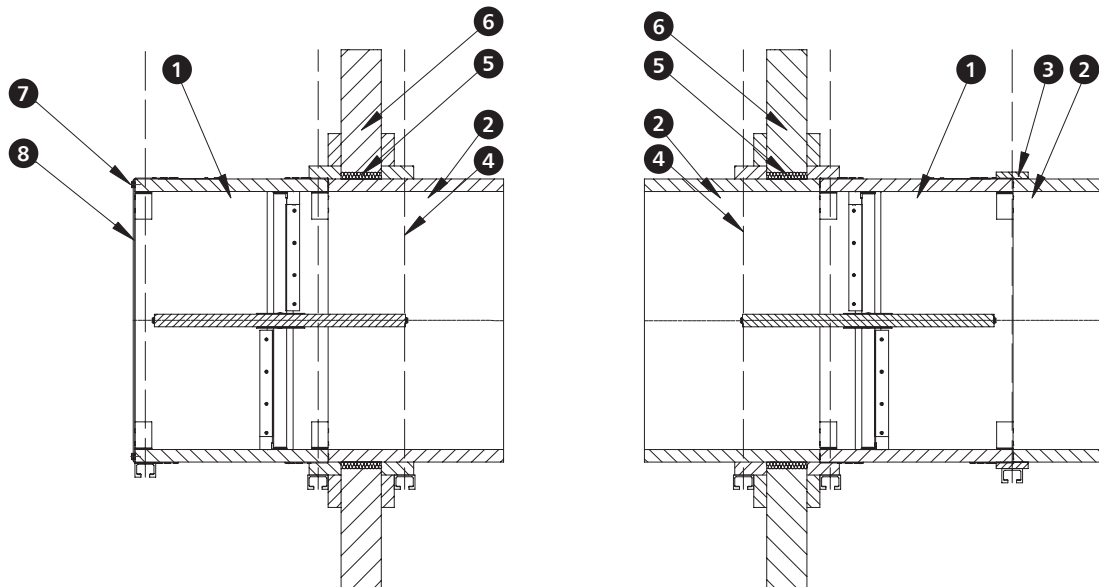
1.5.1 | Damper installation in light walls (plasterboard)



1. mcr FID B BxH smoke damper
2. multi-compartment smoke extract duct – e.g. made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. system of installation hangers ensuring operational stability

5. fireproof duct installation penetration system
6. plasterboard wall
7. M10 x 20 bolt
8. MWB system grille (optional)

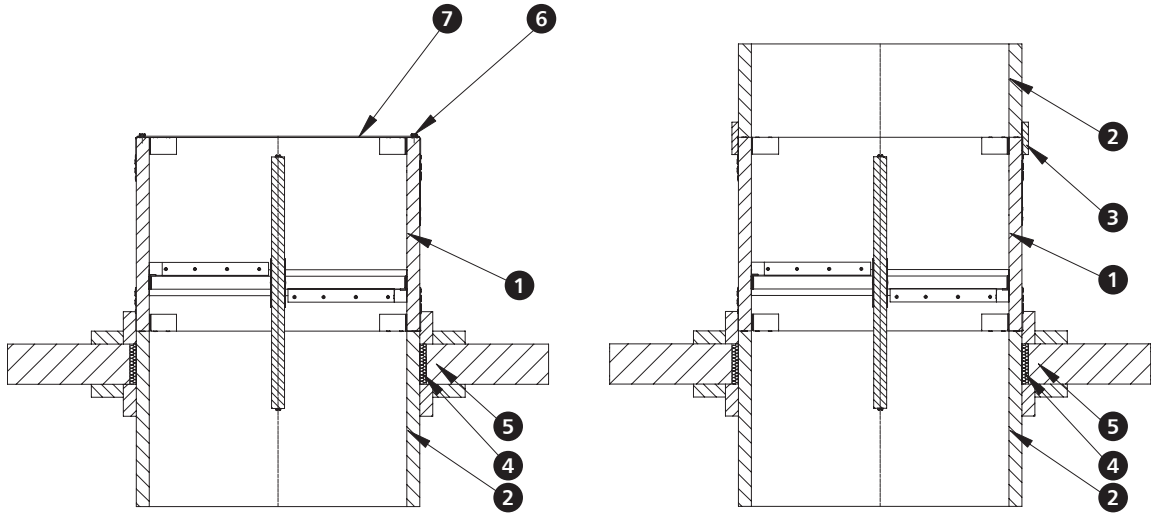
1.5.2 | Damper installation in solid walls



1. mcr FID B BxH smoke damper
2. multi-compartment smoke extract duct – e.g. made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. system of installation hangers ensuring operational stability

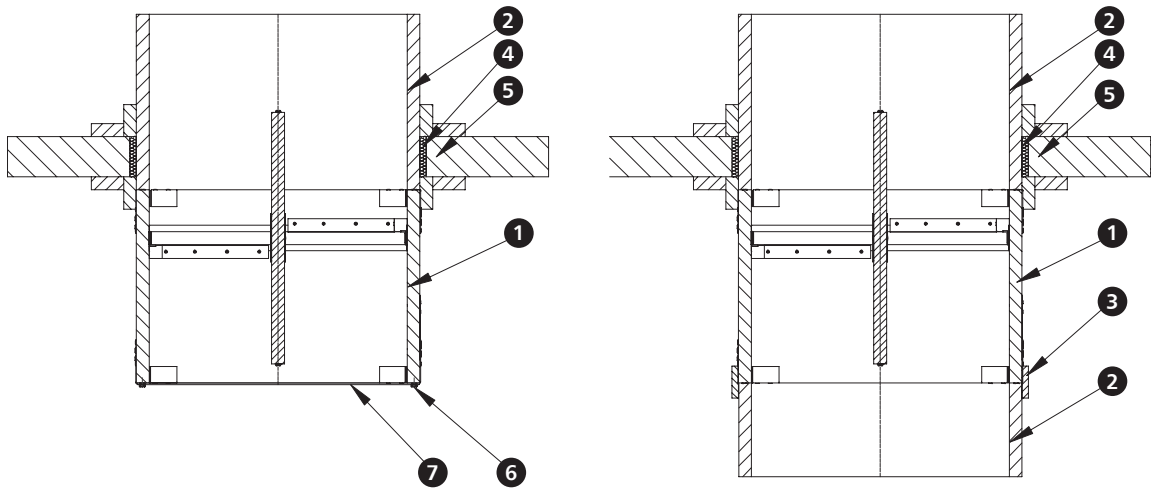
5. fireproof duct installation penetration system
6. solid wall
7. M10 x 20 bolt
8. MWB system grille (optional)

1.5.3 | Installation of damper in floor slabs – damper above the floor slab



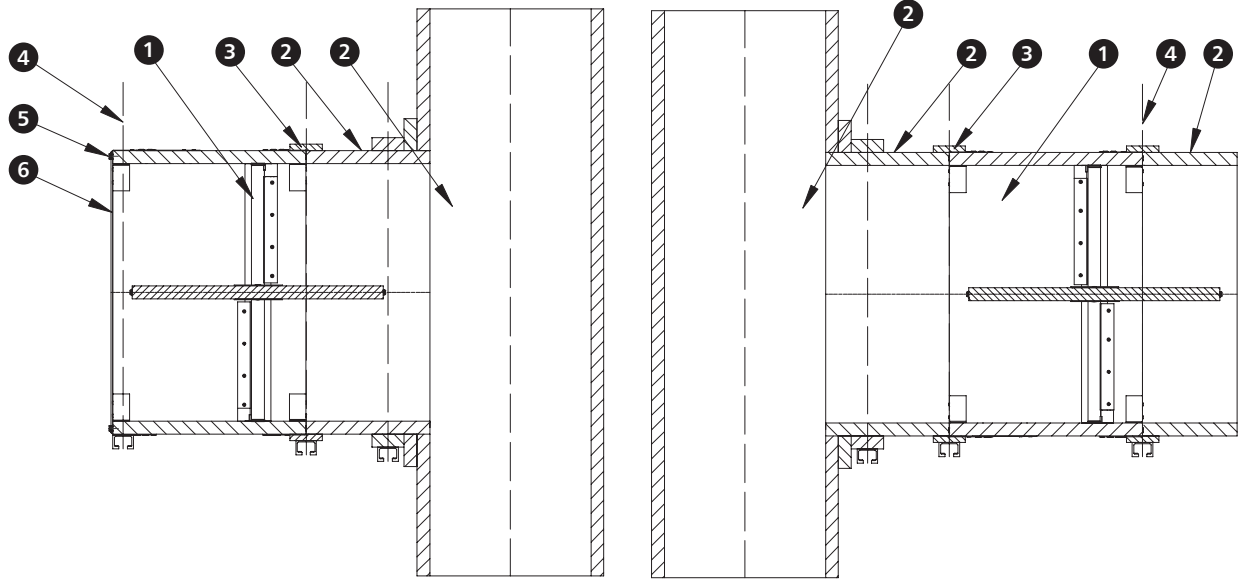
- | | |
|---|---|
| <ul style="list-style-type: none"> 1. mcr FID B BxH smoke damper 2. multi-compartment smoke extract duct – e.g. made of fire-proof boards 3. a strip of fire-proof board along the entire length of the BxH side | <ul style="list-style-type: none"> 4. fireproof duct installation penetration system 5. floor slab 6. M10 x 20 bolt 7. MWB system grille (optional) |
|---|---|

1.5.4 | Installation of damper in floor slabs – damper below the floor slab



- | | |
|---|---|
| <ul style="list-style-type: none"> 1. mcr FID B BxH smoke damper 2. multi-compartment smoke extract duct – e.g. made of fire-proof boards 3. a strip of fire-proof board along the entire length of the BxH side | <ul style="list-style-type: none"> 4. fireproof duct installation penetration system 5. floor slab 6. M10 x 20 bolt 7. MWB system grille (optional) |
|---|---|

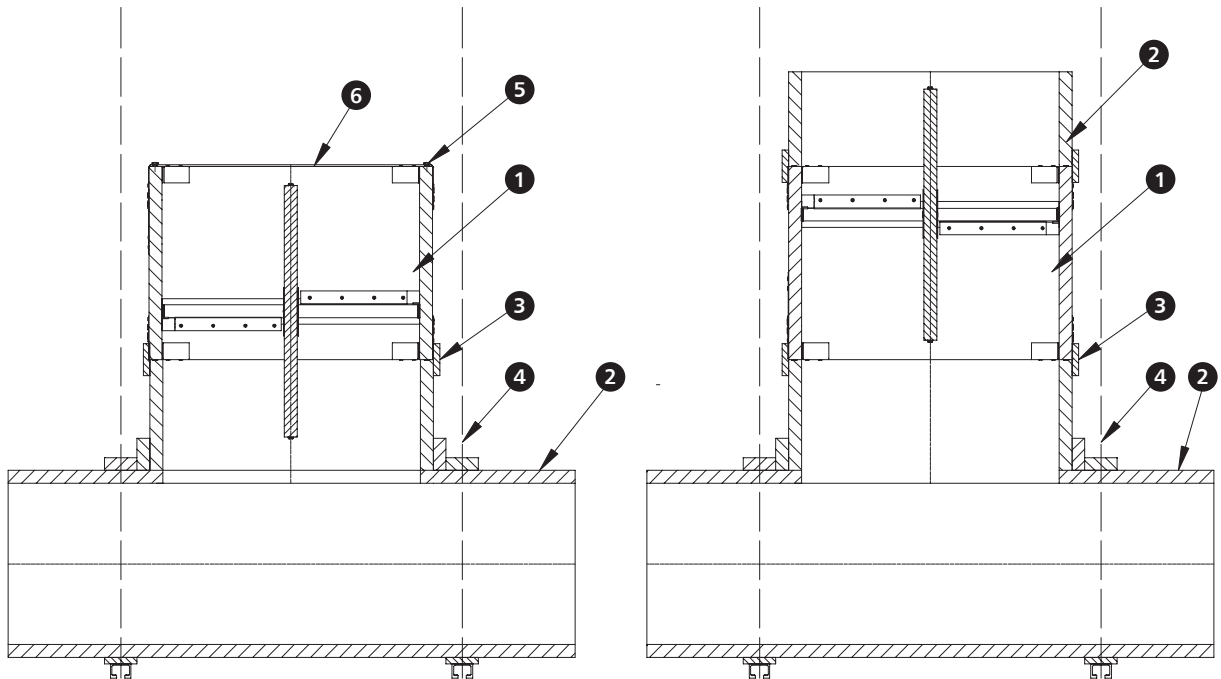
1.5.5 | Damper installation on horizontal ducts



- 1. mcr FID B BxH smoke damper
- 2. multi-compartment smoke extract duct – e.g. made of fire-proof boards
- 3. a strip of fire-proof board along the entire length of the BxH side

- 4. installation hangers system
- 5. M10 x 20 bolt
- 6. MWB system grille (optional)

1.5.6 | Damper installation on vertical ducts

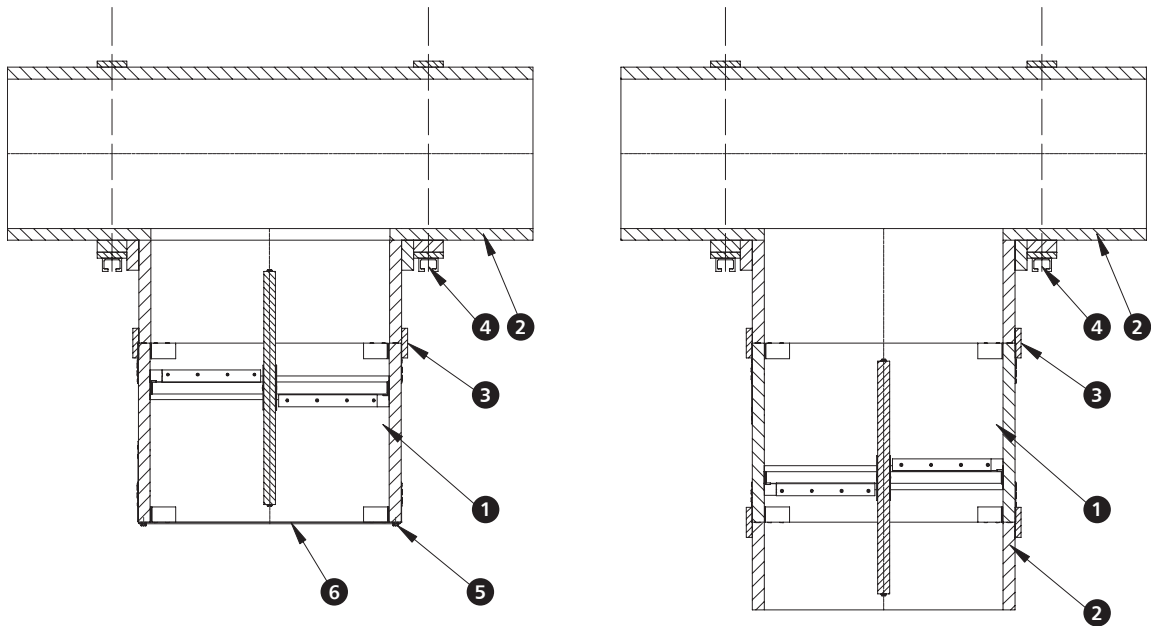


- 1. mcr FID B BxH smoke damper
- 2. multi-compartment smoke extract duct – fire-proof board
- 3. a strip of fire-proof board along the entire length of the BxH side

- 4. installation hangers system
- 5. M10 x 20 bolt
- 6. MWB system grille (optional)

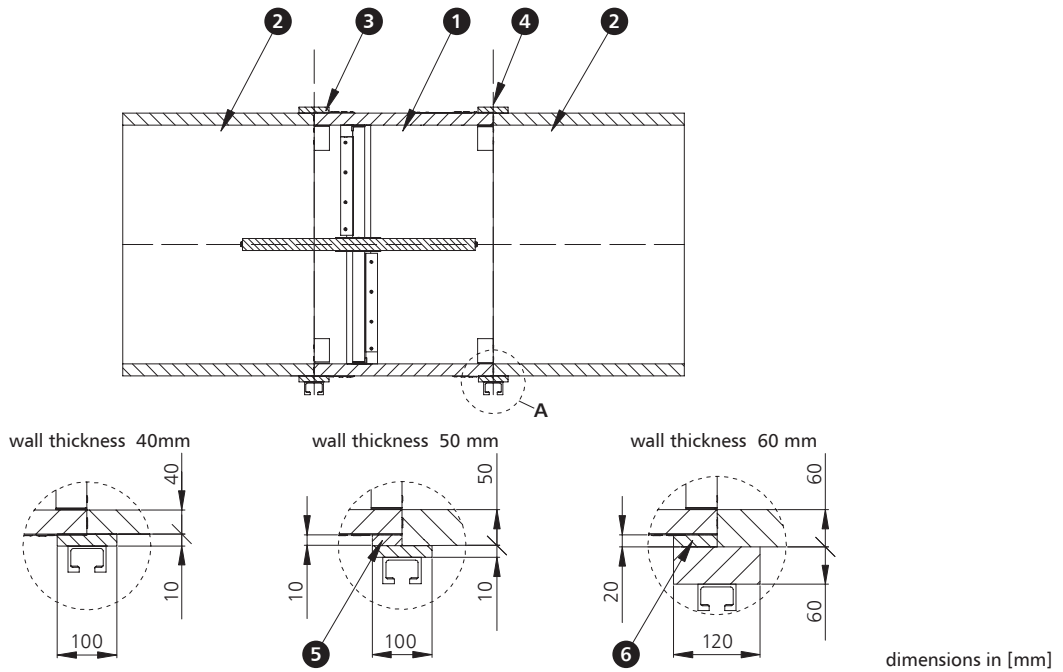
mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

1.5.7 | Damper installation on vertical ducts



- 1. mcr FID B BxH smoke damper
- 2. multi-compartment smoke extract duct – fire-proof board
- 3. a strip of fire-proof board along the entire length of the BxH side
- 4. installation hangers system
- 5. M10 x 20 bolt
- 6. MWB system grille (optional)

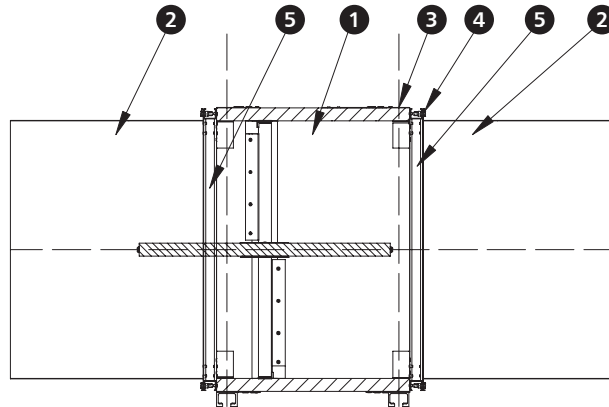
1.5.8 | Damper connection with a multi-compartment duct, e.g. made of fire-proof boards with various wall thickness



- 1. mcr FID B BxH smoke damper
- 2. multi-compartment smoke extract duct – fire-proof board
- 3. a strip of fire-proof board along the entire length of the BxH side
- 4. installation hangers system
- 5. a strip of fire-proof board along the entire length of the BxH side with the dimensions 10 x 50 mm
- 6. a strip of fire-proof board along the entire length of the BxH side with the dimensions 20 x 60 mm

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

1.5.9 | Damper connection with single-compartment duct, e.g. made of metal sheets



- 1. mcr FID B BxH smoke damper
- 2. single-compartment smoke extract duct – metal sheets
- 3. installation hangers system
- 4. M10 x 20 bolt
- 5. RB mounting frame

Smoke extraction ducts should be made in accordance with the ducts manufacturer's guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. The shut-off damper in vertical fire ventilation systems may be installed across the horizontal smoke extract duct or on the sides of the horizontal smoke extract duct or on the surface of any side of the vertical smoke extract duct. A masking grille may terminate the system.

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

1.6 | mcr FID B rectangular dampers technical parameters

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		200					250					300					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [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	

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		200					250					300					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	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	

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		350					400					450					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [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	

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		350					400					450					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	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	

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

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S_e – damper active cross-section [m²]

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

		height H [mm]															
		500					550					600					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [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	

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

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S_e – damper active cross-section [m²]

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

		height H [mm]															
		500					550					600					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	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	

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S_e – damper active cross-section [m²]

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

		height H [mm]															
		650					700					750					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [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	

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d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		650					700					750					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	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	

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S_e – damper active cross-section [m²]

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

		800					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.160	0.149	2 148	5	29
		6			3 223	11	40
		8			4 297	19	47
		10			5 371	30	53
	250	4	0.200	0.187	2 686	5	30
		6			4 028	11	41
		8			5 371	19	48
		10			6 714	30	54
	300	4	0.240	0.224	3 223	4	30
		6			4 834	10	41
		8			6 445	18	48
		10			8 057	28	54
350	4	0.280	0.261	3 760	4	30	
	6			5 640	10	41	
	8			7 520	17	48	
	10			9 400	27	54	
400	4	0.320	0.298	4 297	4	31	
	6			6 445	10	41	
	8			8 594	17	49	
	10			10 742	27	55	
450	4	0.360	0.336	4 834	4	29	
	6			7 251	8	39	
	8			9 668	14	47	
	10			12 085	22	53	
500	4	0.400	0.373	5 371	4	29	
	6			8 057	8	40	
	8			10 742	14	47	
	10			13 428	22	53	
550	4	0.440	0.410	5 908	3	29	
	6			8 862	8	40	
	8			11 817	13	47	
	10			14 771	21	53	

		800					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	600	4	0.480	0.448	6 445	3	29
		6			9 668	7	39
		8			12 891	13	47
		10			16 114	20	53
	650	4	0.520	0.485	6 983	3	28
		6			10 474	7	39
		8			13 965	12	46
		10			17 456	19	52
	700	4	0.560	0.522	7 520	3	28
		6			11 280	6	39
		8			15 039	12	46
		10			18 799	18	52
800	4	0.640	0.597	8 594	3	27	
	6			12 891	6	38	
	8			17 188	10	45	
	10			21 485	16	51	
900	4	0.720	0.671	9 668	3	28	
	6			14 502	6	38	
	8			19 336	10	46	
	10			24 170	16	51	
1000	4	0.800	0.746	10 742	3	28	
	6			16 114	6	39	
	8			21 485	10	46	
	10			26 856	16	52	
1100	4	0.880	0.821	11 817	3	28	
	6			17 725	6	39	
	8			23 633	10	46	
	10			29 542	16	52	
1200	4	0.960	0.895	12 891	2	28	
	6			19 336	5	39	
	8			25 782	10	46	
	10			32 227	15	52	

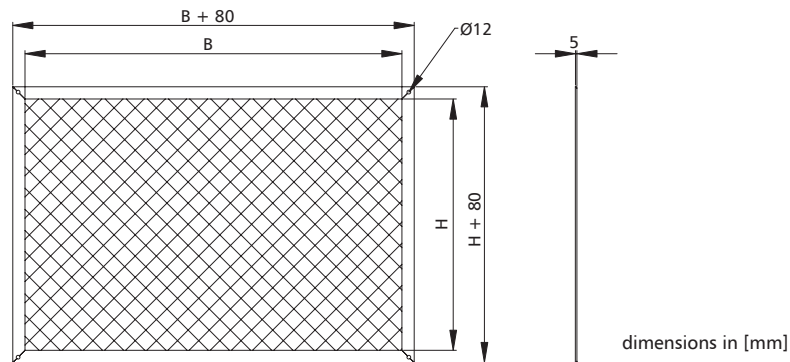
mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

1.7 | Estimated weight of the mcr FID B rectangular dampers [kg]

		width B [mm]																					
		200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	
height H [mm]	200	26	28	29	31	33	34	36	37	39	40	42	43	45	46	48	49	51	53	54	56	57	
	250	28	30	31	33	34	36	37	39	41	42	44	45	47	49	50	52	53	55	57	58	60	60
	300	29	31	33	34	36	38	39	41	43	44	46	48	49	51	53	54	56	58	59	61	62	62
	350	31	33	34	36	38	40	41	43	45	46	48	50	51	53	55	57	58	60	62	63	63	65
	400	33	34	36	38	40	41	43	45	47	48	50	52	54	55	57	59	61	62	64	66	66	68
	450	34	36	38	40	41	43	45	47	49	50	52	54	56	58	59	61	63	65	67	69	69	70
	500	36	37	39	41	43	45	47	49	51	52	54	56	58	60	62	64	66	67	69	71	71	73
	550	37	39	41	43	45	47	49	51	53	54	56	58	60	62	64	66	68	70	72	74	74	76
	600	39	41	43	45	47	49	51	53	55	57	59	60	62	64	66	68	70	72	74	76	76	78
	650	40	42	44	46	48	50	52	54	57	59	61	63	65	67	69	71	73	75	77	79	81	81
	700	42	44	46	48	50	52	54	56	59	61	63	65	67	69	71	73	75	77	79	81	84	84
	750	43	45	48	50	52	54	56	58	60	63	65	67	69	71	73	76	78	80	82	84	86	86
	800	45	47	49	51	54	56	58	60	62	65	67	69	71	73	76	78	80	82	84	87	89	89

1.8 | Accessories

1.8.1 | MWB grille



MWB system masking elements are designed to fulfill either supply or exhaust function. They allow for an aesthetic system termination. They come with a fixed steel mesh that covers the damper, reducing its visibility. Bolts are used to attach the masking element body to the damper. Such a solution allows for installing the product even in the most visually-demanding applications. The masking elements are painted in RAL 9010 as a standard (available in any colour from the RAL range on request).

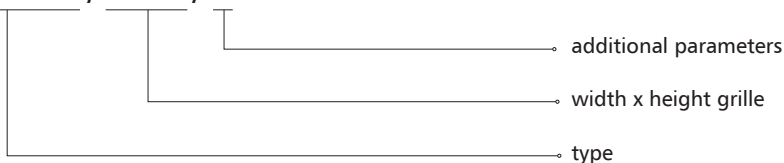
Dimensions:

- » nominal width B: from 200 to 1200 mm
- » nominal height H from 200 mm to 800 mm
- » nominal thickness G 5 mm

Apart from the standard dimensions, masking elements may be manufactured with intermediate dimensions.

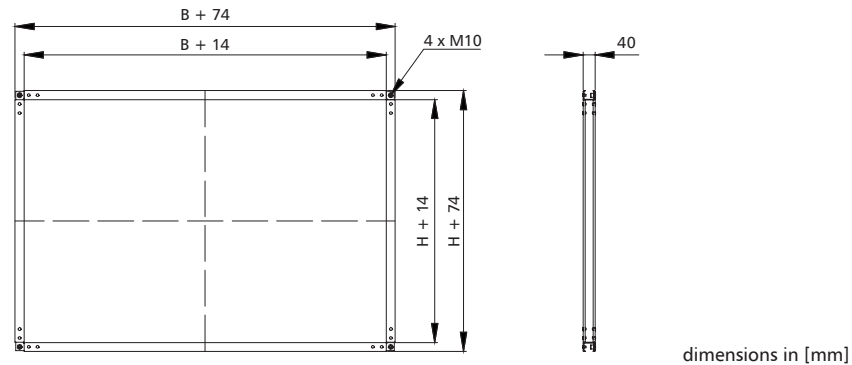
Marking:

mcr MWB / B x H / X



mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

1.8.2 | RB connecting subframe



Mcr RB connection frames are used to connect a steel ventilation duct to the damper. The connection may be made using bolts in the corners of the frame, as well as using latches/hasps for ventilation ducts or self-drilling screws.

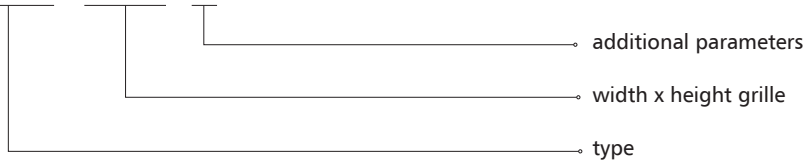
Dimensions:

- » nominal width B: from 200 to 1200 mm
- » nominal height H from 200 mm to 800 mm
- » nominal thickness G 40 mm

Apart from the standard dimensions, connection frames may be manufactured with intermediate dimensions.

Marking:

mcr RB / B x H / X



X – material

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

KN – stainless steel

KK – 1.4404 acid-proof steel

1.9 | Marking

mcr FID B B x H 1 / 2 / 3



1 - control:

» trigger control mechanism

BE24 – actuator without a return spring, U = 24 V AC/DC

BEE24 – actuator without a return spring, U = 24 V AC/DC

BEN24 – actuator without a return spring, U = 24 V AC/DC

BE24-ST (with the BKNE230-24 option) – actuator without a return spring, U = 24 V AC/DC, w/plug for the SBS control system

BEE24-ST (with the BKNE230-24 option) – actuator without a return spring, U = 24 V AC/DC, w/plug for the SBS control system

BEN24-ST (with the BKNE230-24 option) – actuator without a return spring, U = 24 V AC/DC, w/plug for the SBS control system

BE230 – actuator without a return spring, U = 230 V AC

BEE230 – actuator without a return spring, U = 230 V AC

BEN230 – actuator without a return spring, U = 230 V AC

mcr FID B | Single-blade smoke control dampers for multi-compartment fire ventilation systems

2 - material

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

3 - additional parameters

» Control mechanism position

[no symbol] – along the damper rotation axis

» Damper axis of rotation

[no symbol] – horizontal axis of rotation

PP_D – vertical axis of rotation – mechanism at the bottom of the damper

PP_G – vertical axis of rotation - mechanism at the top of the damper

» Extended damper casing

[no symbol] – standard casing length

NOTE: separate additional parameters entered with the “/” sign

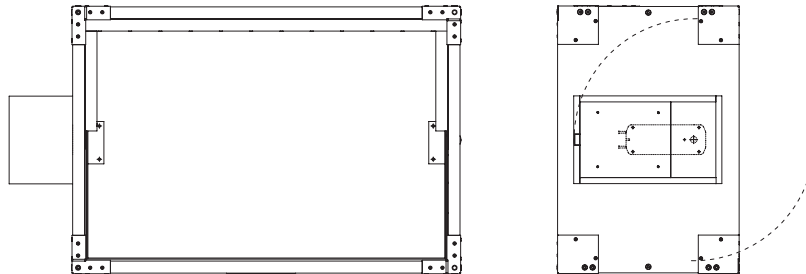
example marking:

mcr FID B 400 x 400 BEN24

Smoke control damper for fire ventilation systems with a 24 V actuator with limit switches.

1.9.1 | Design standards

» symmetrical damper



Chapter 16 - power supply and control (p. 262) contains the following information:
- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper.

mcr FID S/S c/P | Low-resistance single-blade cut-off fire dampers for comfort ventilation systems



downloadable models
on the website
under the designer zone tab



- » **EIS120**
- » Fire resistance class: EI120 (v_e h_o $i \leftrightarrow o$)S.
- » Certificate of constancy of performance 1488-CPR-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 a fire resistance rating independent of the airflow direction and installation side.
- » Lower acoustic noise and hydraulic resistance in the system achieved by reducing damper blade thickness.
- » Admissible for operation with a horizontal and vertical rotation axis.

2.1 | Application

mcr FID S/S c/P low-resistance cut-off dampers are designed for installation in general ventilation systems at installation passages through vertical and horizontal construction partitions. These dampers are intended, for example, for applications in systems with increased acoustic requirements.

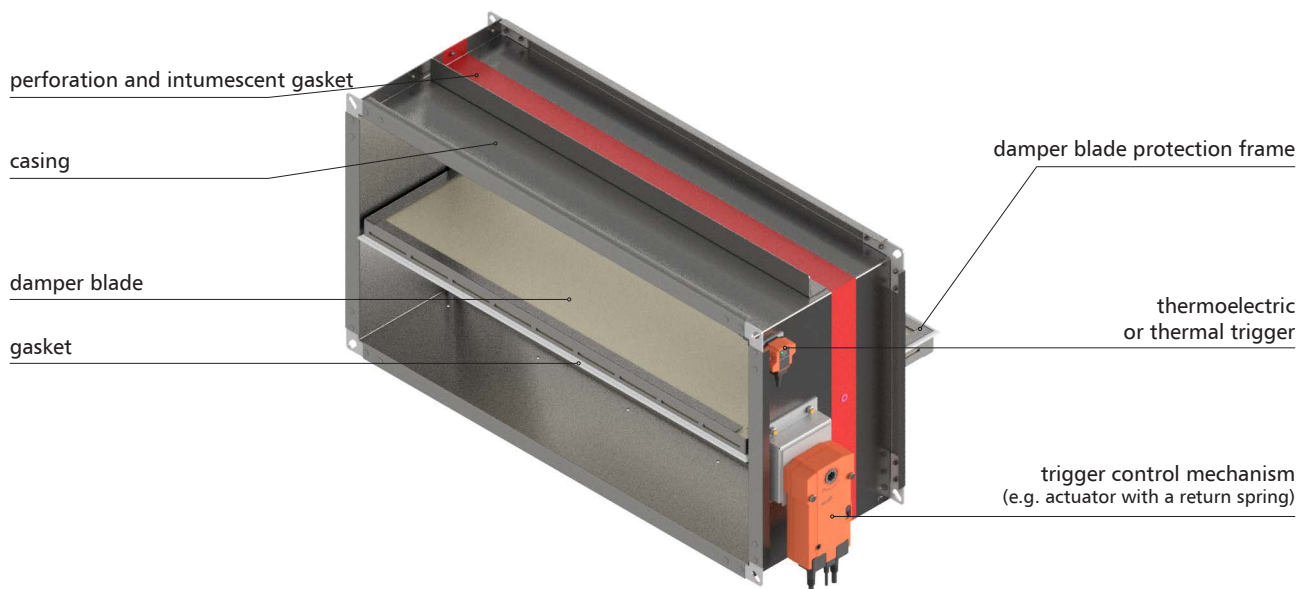
During a fire, they preserve the fire resistance rating of the construction partition that the ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and fire gasses to the remaining part of the building which is not on fire. During normal system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

The dampers cannot be operated in systems exposed to dust, unless included in a special, individually developed service and technical inspections programme. Admissible flow velocity in the connected duct is 12 m/s.

In the version designed for explosion hazard zones (EX version), the dampers can be operated in gas explosion hazard zone 1 inside and outside ventilation ducts and in dust explosion hazard zone 21 outside these ducts. The dampers have been certified in compliance with the ATEX directive 94/9/EC and meet the requirements of group II category 2G and -/2D:

- » » II 2G Ex h IIC T6 Gb
 - » » II -/2D Ex h IIIC T72° -/Db
- Ambient temperature: T_a : -20° ... +50°C

2.2 | Design



mcr FID S/S c/P | Low-resistance single-blade cut-off fire dampers for comfort ventilation systems

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 galvanized steel sheets (Zn 275 g/m² coating). A special casing is used for chemically aggressive environments, which features steel elements 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, where the damper blade is placed, the casing is perforated with a perforation width of 30 mm. An intumescent gasket is placed on the inner side of the casing, around the closed damper blade. The damper blade is made of a fire-proof panel with a total thickness of 30 mm. The damper blade is embedded in a metal sheet reinforcement profile. The inner surface is equipped with a „P“-type ventilation gasket, which ensures the tightness of dampers at ambient temperature. Both ends of the fire damper casing are terminated with flange connections.

2.3 | Versions

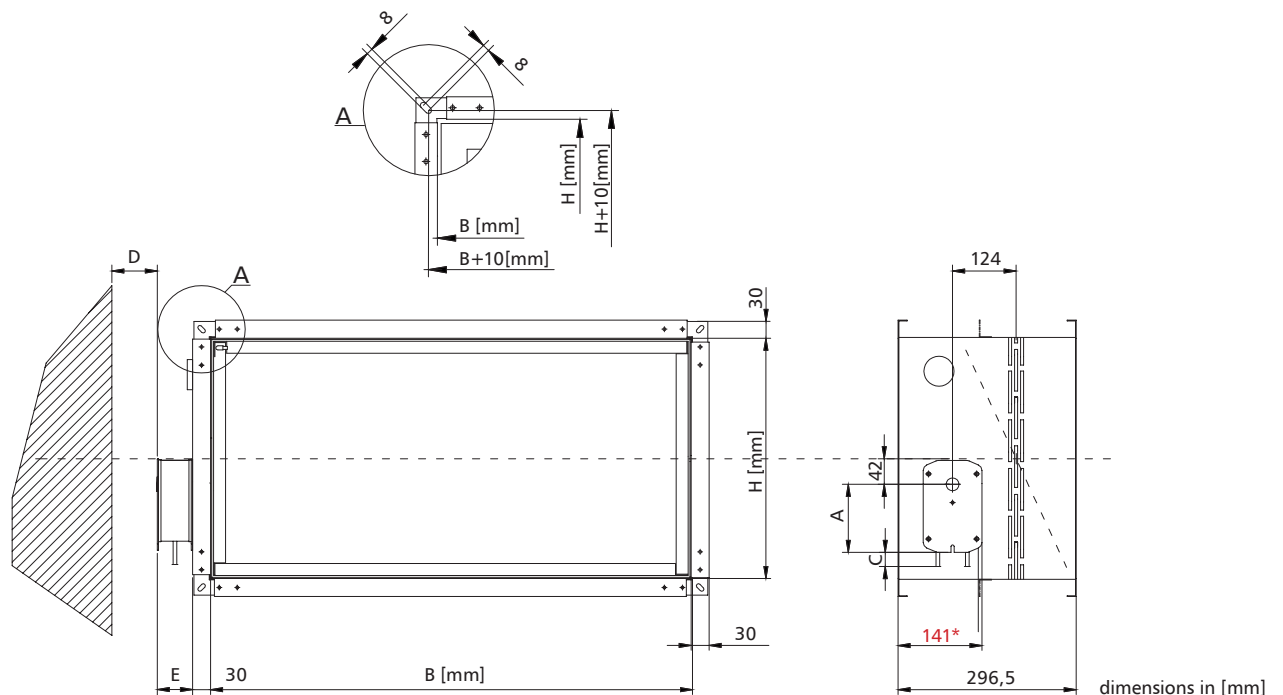
2.3.1 | Damper closing and opening with an actuator

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

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

Thermoelectric triggers are equipped with a test switch.

Dampers with actuators close as a result of the thermoelectric trigger tripping or power supply cut-off as a result of the actuator return spring action. The dampers open when power supply voltage is applied to the actuator terminals. Dampers with those actuators may be opened manually using a key.

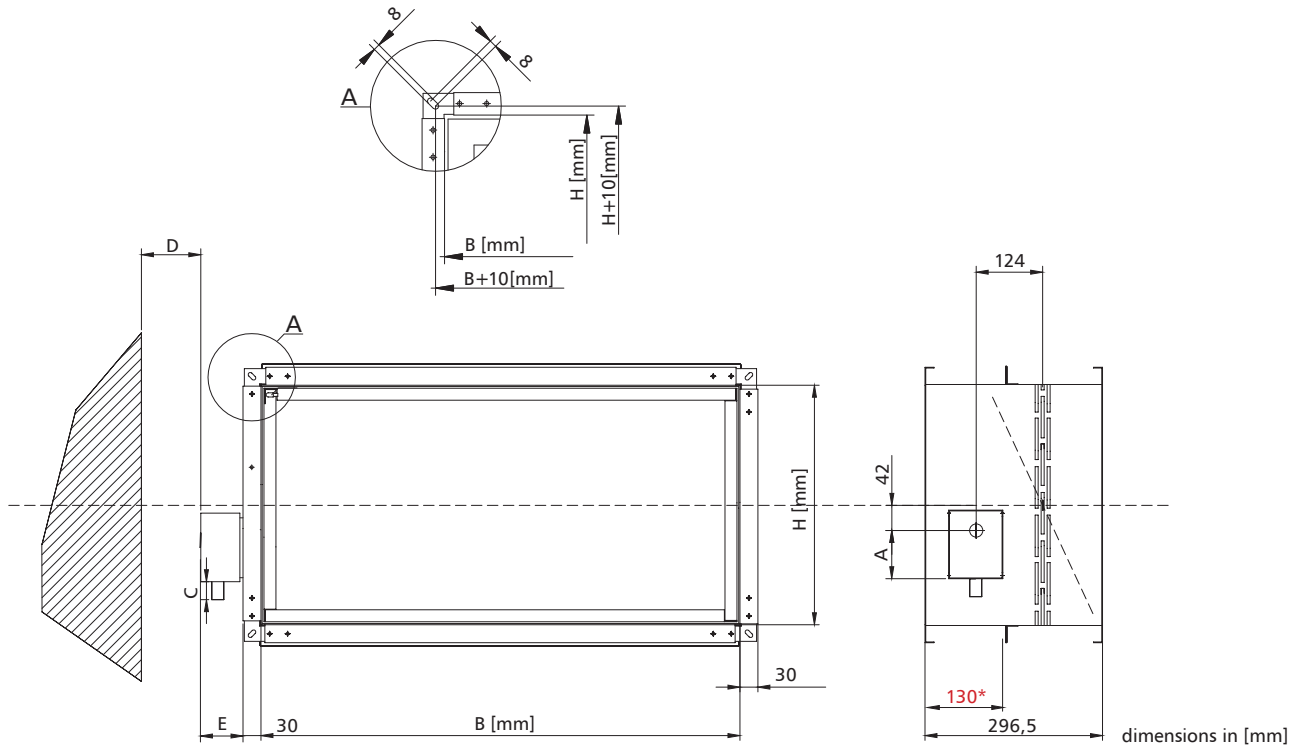


*embedding border

2.3.2 | Cut-off fire damper for ventilation ducts with a spring drive and thermal trigger.

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

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



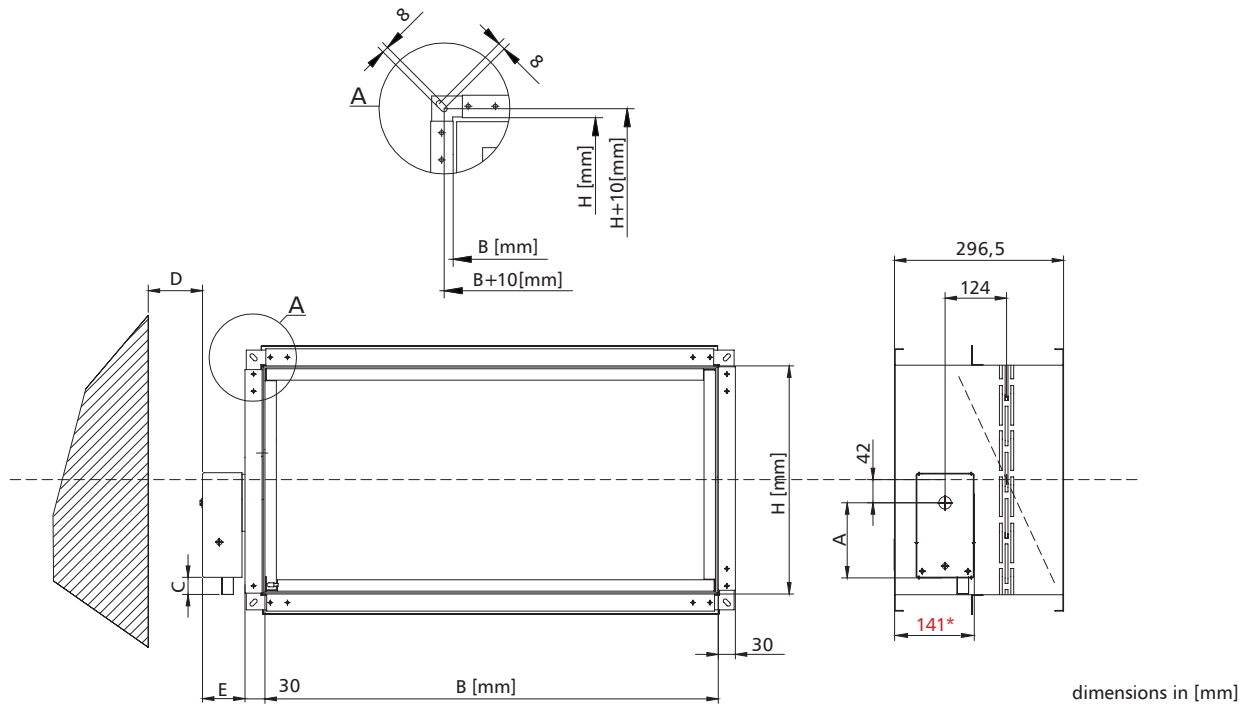
mechanism	A	C	D	E
RST	50	30	75	70

*embedding border

2.3.3 | 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 fire damper blade remains open. In case of fire, the blade closes automatically or through the fire automation system in case of a damper with an electromagnetic trigger.

mcr FID S/S c/P dampers are equipped with a KW1 trigger control mechanism with a drive spring and a cam-lever system. A 74°C thermal trigger (optionally 95°C) is integrated into the damper mechanism. Once the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. A mechanical blade position indicator is placed on the KW1 mechanism. 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. The mechanism features a test and blade button-release functions. Blade re-opening is activated manually.



mechanism	A	C	D	E
KW1	130	30	75	80

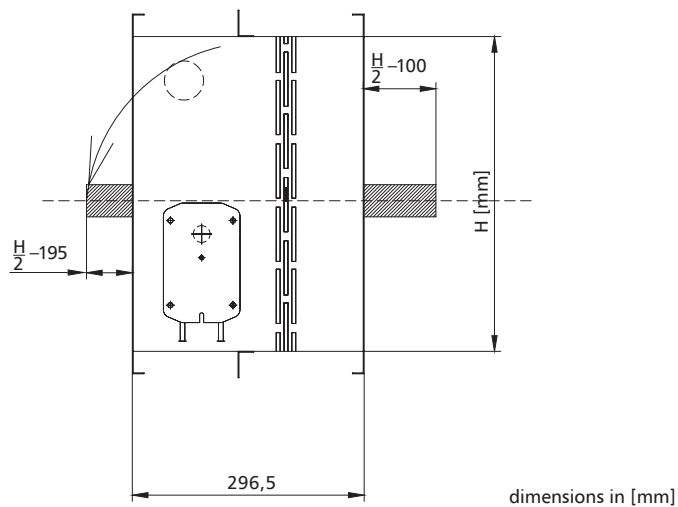
*embedding border

2.4 | Dimensions

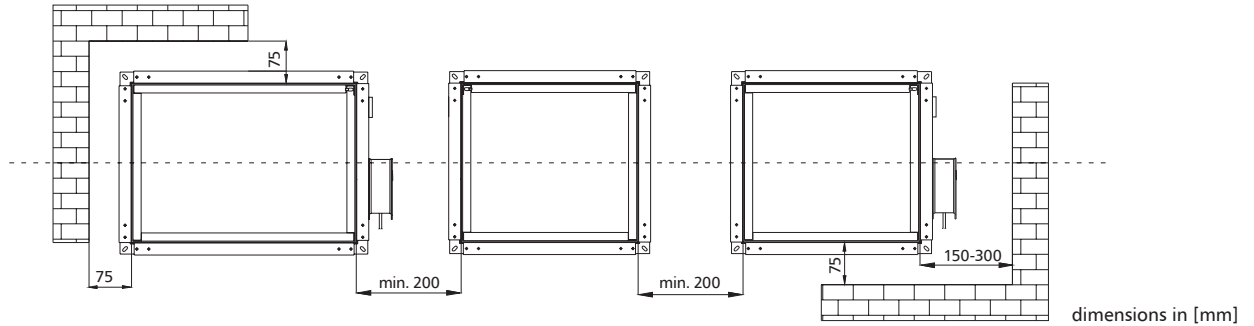
rectangular dampers:

- » nominal width B: from 200 mm to 1000 mm
- » nominal height H: from 200 mm to 800 mm
- » maximum single damper cross-section surface up to 0.8 m²

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



» Distance between systems and partitions



If the installation documentation does not provide otherwise, the minimum spacing between the casings of two fire dampers is ≥ 200 mm and ≥ 75 mm between the wall or floor slab, as per the EN-1366-2 standard.

2.5 | Installation

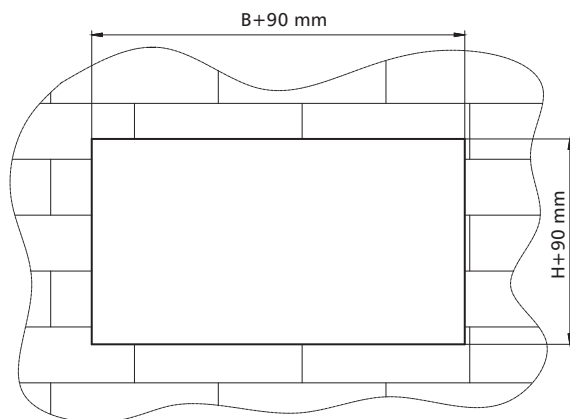
The mcr FID S/S c/P rectangular dampers have been classified in class E120($v_e h_o i \leftrightarrow o$)S in a size range of up to 800 x 400 and E120($v_e i \leftrightarrow o$)S in a size range of up to 1000 x 800. The dampers can be installed in concrete partitions for rigid walls/shafts with a minimum thickness of 110 mm, partitions made of full bricks or aerated concrete blocks with a min. thickness of 115 mm, light walls of gypsum boards on a steel framework with a thickness of at least 125 mm and E120 or higher fire rating, and concrete floor slabs with a min. thickness of 150 mm. The dampers may be installed on grout or in dry installation in mineral wool with a horizontal and vertical rotation axis.

Damper installation with a vertical axis of rotation

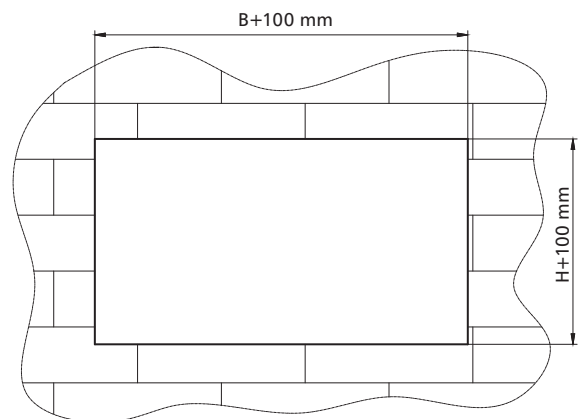
Such installation must be clearly stated in the draft documentation and reported to the damper's manufacturer in the order. BxH damper dimensions should be provided in a manner similar to the damper with a horizontal rotation axis.

2.5.1 | Preparation of installation openings

» installation openings preparation
- wet installation – preferred opening

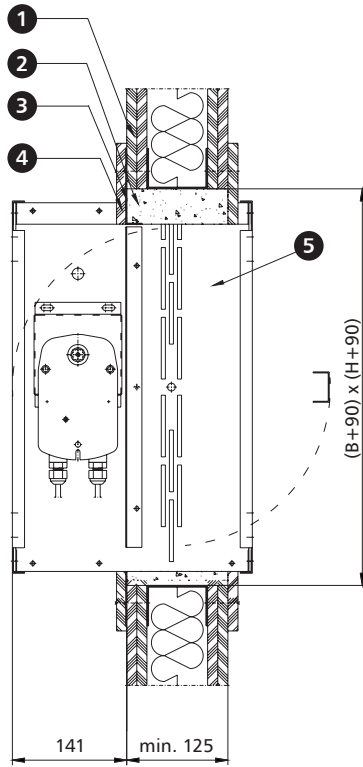


» installation openings preparation
- dry installation – preferred opening

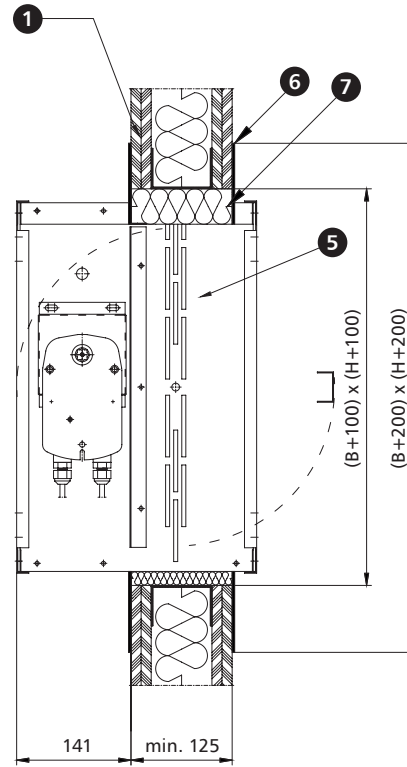


2.5.2 | Sample installation in gypsum board light walls

» WET installation



» DRY installation



dimensions in [mm]

- 1. light wall
- 2. sealing - masonry mortar*
- 3. mounting flange - embedding border
- 4. damper circumference gypsum board trim 100 x 12.5

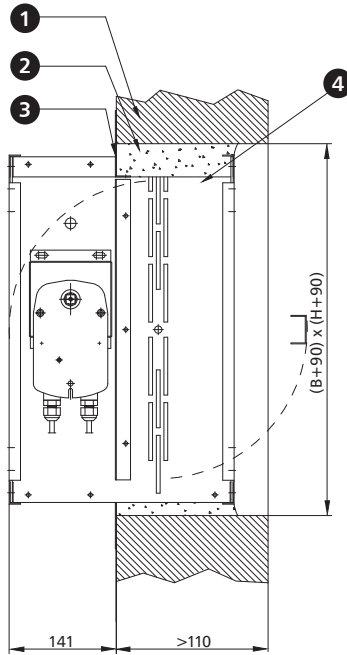
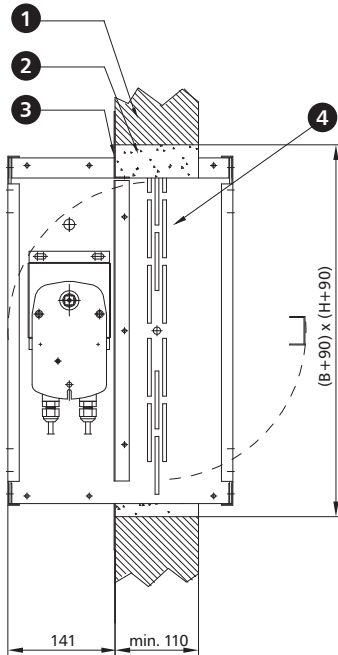
- 5. mcr FID S/S c/P fire damper
- 6. elastic fire protection grout/mass*
- 7. mineral wool*

* Recommended damper installation in a dry system is based on wool with a min. density of 100 kg/m³ and a fire resistance class A1, as well as on securing the contact portion between the damper and the wall and the wall itself with the elastic fire protection mass mcr Polylac Elastic with a thickness of 1 mm, as per the drawing above. Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

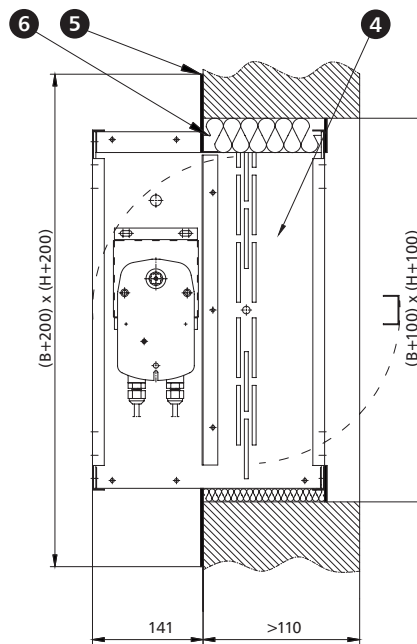
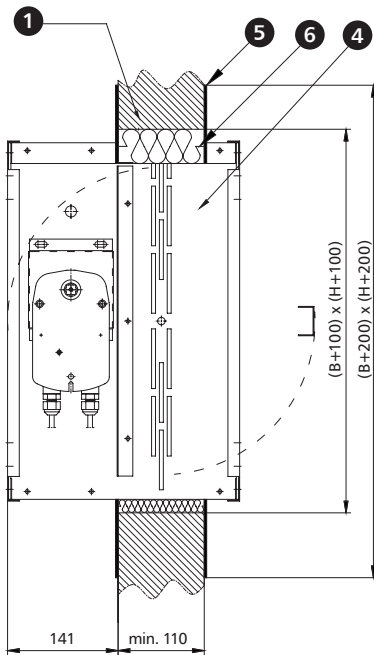
NOTE: If the damper is installed in a wall with a thickness of less than 125 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

2.5.3 | Sample installation in concrete walls

» **WET installation**



» **DRY installation**



dimensions in [mm]

- 1. masonry wall
- 2. sealing - masonry mortar*
- 3. mounting flange - embedding border

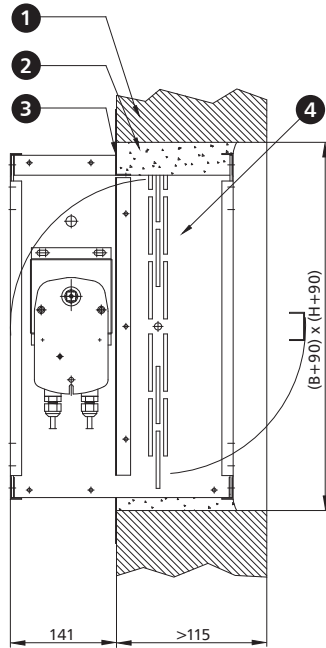
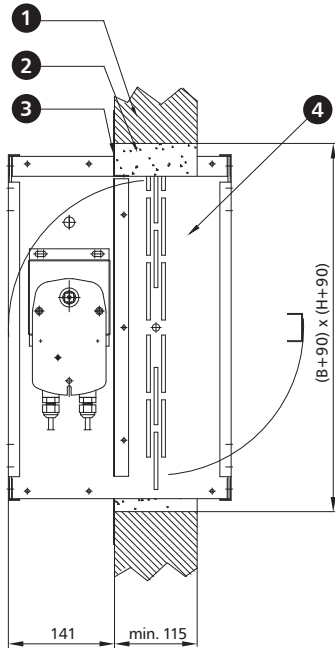
- 4. mcr FID S/S c/P fire damper
- 5. elastic fire protection grout/mass*
- 6. mineral wool*

* Recommended damper installation in a dry system is based on wool with a min. density of 100 kg/m³ and a fire resistance class A1, as well as on securing the contact portion between the damper and the wall and the wall itself with the elastic fire protection mass mcr Polyac Elastic with a thickness of 1 mm, as per the drawing above. Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

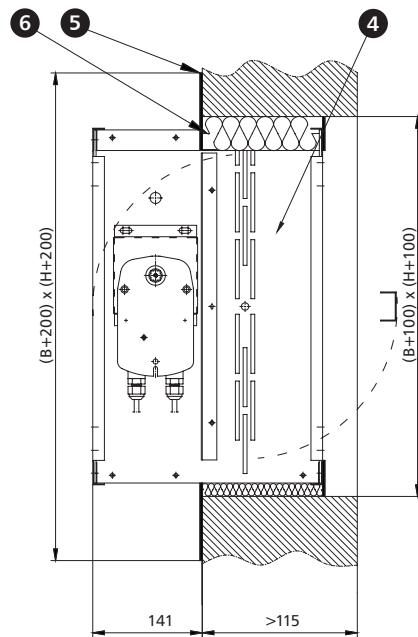
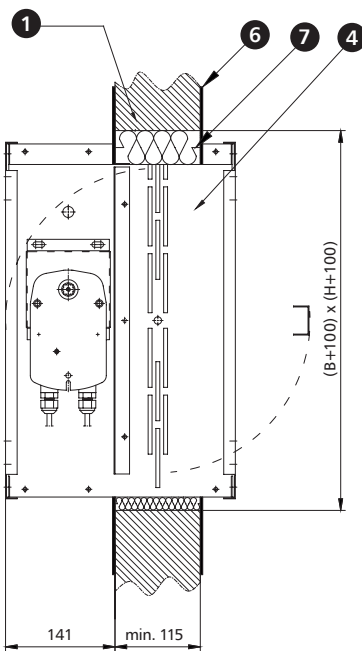
NOTE: If the damper is installed in a wall with a thickness of less than 110 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

2.5.4 | Sample installation in masonry walls

» WET installation



» DRY installation



dimensions in [mm]

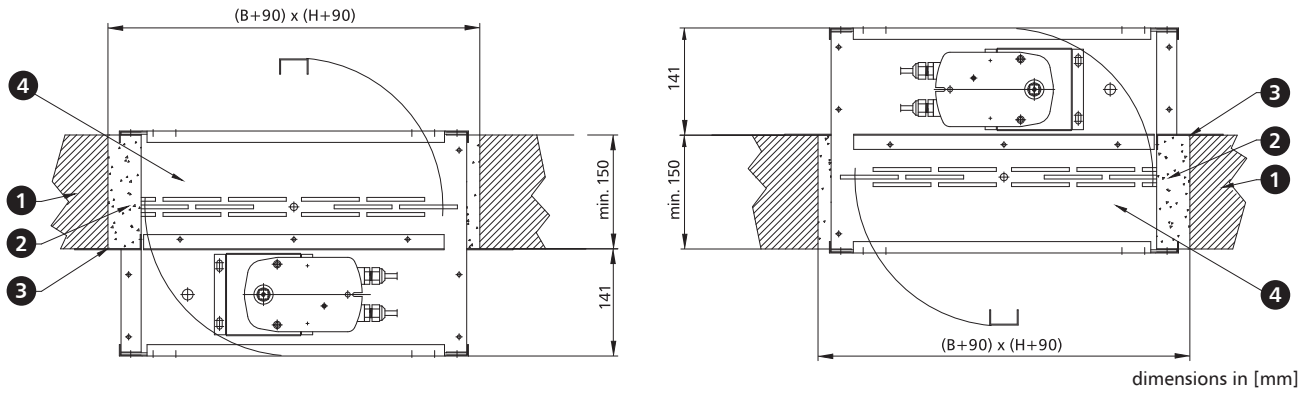
- 1. light wall
- 2. sealing - masonry mortar*
- 3. mounting flange - embedding border
- 4. damper circumference gypsum board trim 100 x 12.5

- 5. mcr FID S/S c/P fire damper
- 6. elastic fire protection grout/mass*
- 7. mineral wool*

* Recommended damper installation in a dry system is based on wool with a min. density of 100 kg/m³ and a fire resistance class A1, as well as on securing the contact portion between the damper and the wall and the wall itself with the elastic fire protection mass mcr Polyac Elastic with a thickness of 1 mm, as per the drawing above. Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a 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.

2.5.5 | Sample installation in floor slabs

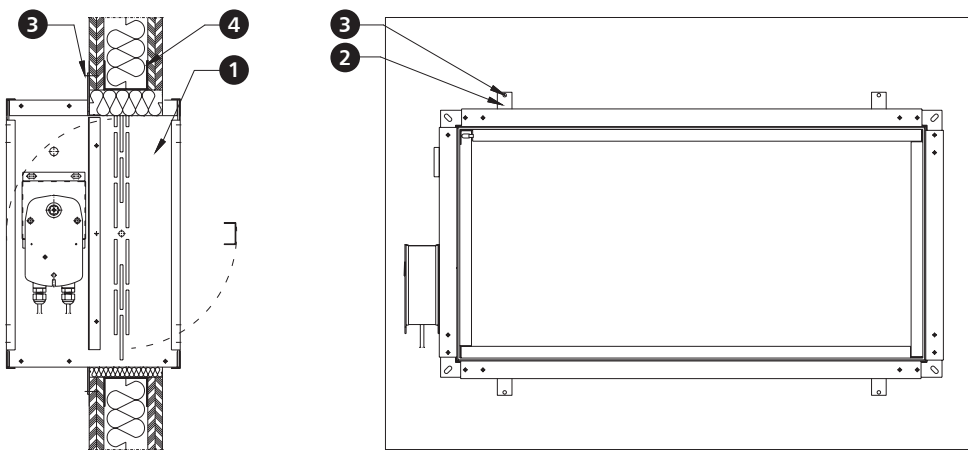


- 1. floor slab
- 2. sealing - cement or cement-lime masonry mortar*

- 3. mounting flange - embedding border
- 4. mcr FID S/S c/P fire damper

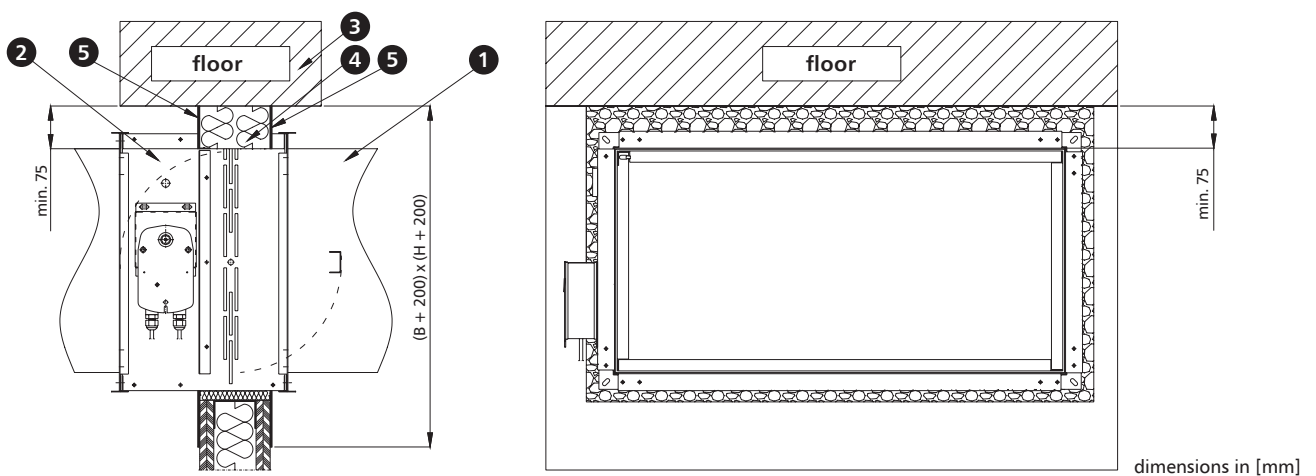
* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

2.5.6 | Sample installation with a bracket



- 1. mcr FID S/S c/P fire damper
- 2. WM installation bracket
- 3. plasterboard screw 3.5 x 20
- 4. e.g. plasterboard wall

2.5.7 | Sample installation below the floor slab



- 1. duct
- 2. mcr FID S/S c/P fire damper
- 3. floor slab
- 4. mineral wool*

- 5. elastic fire protection grout/mass*

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

2.6 | mcr FID S/S c/P rectangular dampers technical parameters

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		200					250					300					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4	0.04	0.033	468	6	26	0.05	0.043	612	6	26	0.06	0.053	756	5	26
		6			702	14	36			918	13	37			1 134	12	37
		8			936	24	44			1 224	24	45			1 512	22	44
		10			1 170	38	50			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	51			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	48	
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	39			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	
900	4	0.18	0.146	2 106	2	17	0.225	0.191	2 754	2	17	0.27	0.236	3 402	2	17	
	6			3 159	4	28			4 131	4	28			5 103	4	27	
	8			4 212	8	35			5 508	7	35			6 804	6	35	
	10			5 265	12	41			6 885	11	41			8 505	10	41	
1000	4	0.2	0.163	2 340	2	15	0.25	0.213	3 060	1	14	0.3	0.263	3 780	1	14	
	6			3 510	3	25			4 590	3	25			5 670	3	25	
	8			4 680	6	33			6 120	6	32			7 560	5	32	
	10			5 850	10	39			7 650	9	38			9 450	8	38	

mcr FID S/S c/P | Low-resistance single-blade cut-off fire dampers for comfort ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		350					400					500					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4	0.07	0.063	900	5	26	0.08	0.073	1 044	5	26	0.1	0.093	1 332	4	26
		6			1 350	12	37			1 566	11	37			1 998	10	37
		8			1 800	21	44			2 088	19	44			2 664	18	44
		10			2 250	32	50			2 610	30	50			3 330	27	50
	250	4	0.0875	0.078	1 125	4	25	0.1	0.091	1 305	4	25	0.125	0.116	1 665	4	26
		6			1 688	10	36			1 958	9	35			2 498	9	36
		8			2 250	17	43			2 610	16	43			3 330	16	44
		10			2 813	27	49			3 263	25	49			4 163	25	50
	300	4	0.105	0.094	1 350	4	26	0.12	0.109	1 566	4	24	0.15	0.139	1 998	4	26
		6			2 025	10	36			2 349	8	35			2 997	8	36
		8			2 700	17	44			3 132	15	42			3 996	15	44
		10			3 375	27	50			3 915	23	48			4 995	23	50
350	4	0.1225	0.109	1 575	4	25	0.14	0.127	1 827	4	25	0.175	0.162	2 331	3	25	
	6			2 363	9	36			2 741	8	36			3 497	8	36	
	8			3 150	15	43			3 654	15	43			4 662	14	43	
	10			3 938	24	49			4 568	23	49			5 828	22	49	
400	4	0.14	0.125	1 800	3	24	0.16	0.145	2 088	3	23	0.2	0.185	2 664	3	25	
	6			2 700	8	34			3 132	7	34			3 996	7	35	
	8			3 600	13	42			4 176	12	41			5 328	13	43	
	10			4 500	21	48			5 220	19	47			6 660	20	49	
450	4	0.1575	0.141	2 025	3	24	0.18	0.163	2 349	3	21	0.225	0.208	2 997	3	24	
	6			3 038	7	34			3 524	6	32			4 496	7	35	
	8			4 050	13	42			4 698	10	39			5 994	12	42	
	10			5 063	20	48			5 873	16	45			7 493	18	48	
500	4	0.175	0.156	2 250	2	20	0.2	0.181	2 610	2	20	0.25	0.231	3 330	3	23	
	6			3 375	5	31			3 915	5	31			4 995	6	34	
	8			4 500	10	38			5 220	9	38			6 660	11	42	
	10			5 625	15	44			6 525	14	44			8 325	17	47	
550	4	0.1925	0.172	2 475	2	19	0.22	0.199	2 871	2	20	0.275	0.254	3 663	2	23	
	6			3 713	5	29			4 307	5	30			5 495	6	33	
	8			4 950	8	37			5 742	8	38			7 326	10	41	
	10			6 188	13	43			7 178	13	43			9 158	15	47	
600	4	0.21	0.188	2 700	2	18	0.24	0.218	3 132	2	22	0.3	0.278	3 996	2	22	
	6			4 050	4	29			4 698	6	33			5 994	5	32	
	8			5 400	8	36			6 264	10	40			7 992	9	40	
	10			6 750	12	42			7 830	16	46			9 990	14	46	
650	4	0.2275	0.203	2 925	2	19	0.26	0.236	3 393	2	18	0.325	0.301	4 329	2	21	
	6			4 388	4	29			5 090	4	29			6 494	5	32	
	8			5 850	8	37			6 786	7	36			8 658	8	39	
	10			7 313	12	42			8 483	11	42			10 823	13	45	
700	4	0.245	0.219	3 150	2	18	0.28	0.254	3 654	2	18	0.35	0.324	4 662	2	20	
	6			4 725	4	28			5 481	4	29			6 993	4	31	
	8			6 300	7	36			7 308	7	36			9 324	7	38	
	10			7 875	11	42			9 135	11	42			11 655	12	44	
750	4	0.2625	0.234	3 375	2	18	0.3	0.272	3 915	2	17	0.375	0.347	4 995	2	19	
	6			5 063	4	29			5 873	4	28			7 493	4	30	
	8			6 750	7	36			7 830	6	36			9 990	7	37	
	10			8 438	11	42			9 788	10	41			12 488	10	43	
800	4	0.28	0.250	3 600	2	18	0.32	0.290	4 176	2	18	0.4	0.370	5 328	2	18	
	6			5 400	4	29			6 264	4	28			7 992	3	29	
	8			7 200	7	36			8 352	6	36			10 656	6	36	
	10			9 000	11	42			10 440	10	42			13 320	9	42	
900	4	0.315	0.281	4 050	1	16	0.36	0.326	4 698	1	16	0.45	0.416	5 994	1	16	
	6			6 075	3	27			7 047	3	27			8 991	3	26	
	8			8 100	6	34			9 396	5	34			11 988	5	34	
	10			10 125	9	40			11 745	8	40			14 985	8	40	
1000	4	0.35	0.313	4 500	1	14	0.4	0.363	5 220	1	13	0.5	0.463	6 660	1	13	
	6			6 750	3	24			7 830	2	24			9 990	2	24	
	8			9 000	5	32			10 440	4	32			13 320	4	31	
	10			11 250	7	38			13 050	7	37			16 650	6	37	

mcr FID S/S c/P | Low-resistance single-blade cut-off fire dampers for comfort ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		600					700					800					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.12	0.113	1 620	4	26	0.14	0.133	1 908	4	26	0.16	0.153	2 196	4	26
		6			2 430	9	36			2 862	9	36			3 294	8	36
		8			3 240	16	44			3 816	15	44			4 392	14	44
		10			4 050	25	50			4 770	24	50			5 490	22	49
	250	4	0.15	0.141	2 025	4	26	0.175	0.166	2 385	4	26	0.2	0.191	2 745	3	25
		6			3 038	8	36			3 578	8	36			4 118	7	36
		8			4 050	15	44			4 770	14	44			5 490	13	43
		10			5 063	23	50			5 963	22	49			6 863	21	49
	300	4	0.18	0.169	2 430	3	25	0.21	0.199	2 862	3	25	0.24	0.229	3 294	3	25
		6			3 645	8	36			4 293	7	36			4 941	7	36
		8			4 860	14	44			5 724	13	43			6 588	12	43
		10			6 075	22	49			7 155	20	49			8 235	19	49
350	4	0.21	0.197	2 835	3	25	0.245	0.232	3 339	3	25	0.28	0.267	3 843	3	25	
	6			4 253	7	36			5 009	7	35			5 765	6	35	
	8			5 670	13	43			6 678	12	43			7 686	11	43	
	10			7 088	20	49			8 348	19	49			9 608	18	49	
400	4	0.24	0.225	3 240	3	25	0.28	0.265	3 816	3	24	0.32	0.305	4 392	3	24	
	6			4 860	7	35			5 724	6	35			6 588	6	35	
	8			6 480	12	43			7 632	11	42			8 784	10	42	
	10			8 100	18	48			9 540	17	48			10 980	16	48	
450	4	0.27	0.253	3 645	3	24	0.315	0.298	4 293	3	24	0.36	0.343	4 941	2	24	
	6			5 468	6	34			6 440	6	34			7 412	5	34	
	8			7 290	11	42			8 586	10	42			9 882	9	42	
	10			9 113	17	48			10 733	16	48			12 353	15	47	
500	4	0.3	0.281	4 050	2	23	0.35	0.331	4 770	2	23	0.4	0.381	5 490	2	23	
	6			6 075	6	34			7 155	5	34			8 235	5	33	
	8			8 100	10	41			9 540	9	41			10 980	9	41	
	10			10 125	15	47			11 925	14	47			13 725	13	47	
550	4	0.33	0.309	4 455	2	22	0.385	0.364	5 247	2	22	0.44	0.419	6 039	2	22	
	6			6 683	5	33			7 871	5	33			9 059	4	33	
	8			8 910	9	41			10 494	8	40			12 078	8	40	
	10			11 138	14	46			13 118	13	46			15 098	12	46	
600	4	0.36	0.338	4 860	2	22	0.42	0.398	5 724	2	21	0.48	0.458	6 588	2	21	
	6			7 290	5	32			8 586	4	32			9 882	4	32	
	8			9 720	8	40			11 448	8	39			13 176	7	39	
	10			12 150	13	45			14 310	12	45			16 470	11	45	
650	4	0.39	0.366	5 265	2	21	0.455	0.431	6 201	2	20	0.52	0.496	7 137	2	20	
	6			7 898	4	31			9 302	4	31			10 706	4	31	
	8			10 530	7	39			12 402	7	39			14 274	6	38	
	10			13 163	12	45			15 503	11	44			17 843	10	44	
700	4	0.42	0.394	5 670	2	20	0.49	0.464	6 678	2	19	0.56	0.534	7 686	1	19	
	6			8 505	4	30			10 017	4	30			11 529	3	30	
	8			11 340	7	38			13 356	6	38			15 372	6	37	
	10			14 175	11	44			16 695	10	43			19 215	9	43	
750	4	0.45	0.422	6 075	2	19	0.525	0.497	7 155	1	18	0.6	0.572	8 235	1	18	
	6			9 113	3	29			10 733	3	29			12 353	3	29	
	8			12 150	6	37			14 310	6	37			16 470	5	36	
	10			15 188	10	43			17 888	9	42			20 588	8	42	
800	4	0.48	0.450	6 480	1	18	0.56	0.530	7 632	1	17	0.64	0.610	8 784	1	17	
	6			9 720	3	28			11 448	3	28			13 176	3	28	
	8			12 960	5	36			15 264	5	35			17 568	5	35	
	10			16 200	9	42			19 080	8	41			21 960	7	41	
900	4	0.54	0.506	7 290	1	15	0.63	0.596	8 586	1	15	0.72	0.686	9 882	1	15	
	6			10 935	2	26			12 879	2	25			14 823	2	25	
	8			14 580	4	33			17 172	4	33			19 764	4	33	
	10			18 225	7	39			21 465	6	39			24 705	6	39	
1000	4	0.6	0.563	8 100	1	13	0.7	0.663	9 540	1	12	0.8	0.763	10 980	1	12	
	6			12 150	2	23			14 310	2	23			16 470	2	22	
	8			16 200	3	31			19 080	3	30			21 960	3	30	
	10			20 250	5	36			23 850	5	36			27 450	5	36	

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

2.7 | 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	900	1000
height H [mm]	200	7.5	8	9	10	11	14	16	18	20	22
	250	8	9.5	10	11	14	15	17	19	21	23
	300	9	10.5	11	12	15	16	18	20	22	24
	350	10	11.5	12	13	16	17	19	21	23	25
	400	11	12.5	13.5	14	17	18	21	22	24	26
	500	13	14.5	15.5	16	18	19	22	24	26	28
	600	15	16.5	17.5	18.5	20	22	24	26	28	30
	700	17	18.5	19.5	20	22	24	26	28	30	32
	800	19	20.5	21.5	22	24	26	28	30	32	34

For dampers with no actuator, subtract ~1 kg from the weight given.

2.8 | Accessories

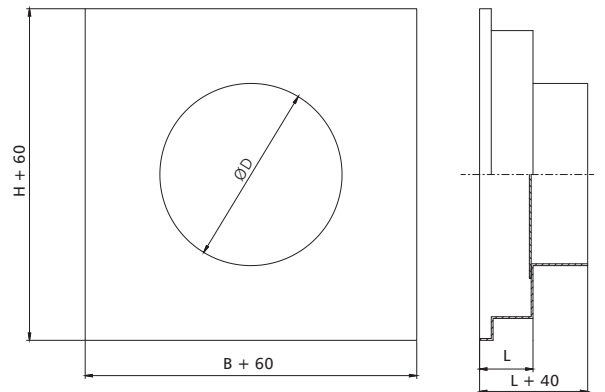
2.8.1 | mcr KRP connection stub

mcr KRP connection stubs are used to connect a circular ventilation duct to a rectangular damper. The connection is a „bare end“ pipe. The diameter of the stub pipe is 2 mm smaller than the diameter of the ventilation duct.

NOTE: due to the asymmetrical position of the fire blade in the damper casing, the connection stubs are of different lengths L, depending on the side of the damper on which they are to be used. Stubs are supplied for both sides of the damper.

Dimensions:

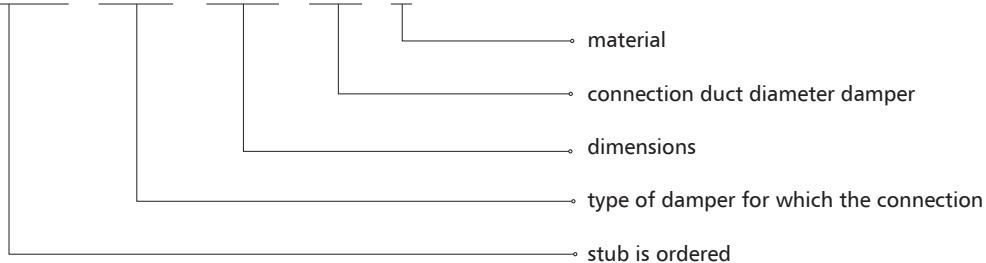
- » BxH - damper dimensions [mm]
- » ØD - diameter of the connection duct [mm]
- » L - length [mm] calculated from the formula: H/2-50 for one connection side and H/2-150 for the other connection side



dimensions in [mm]

Marking:

mcr KRP / FID S / B x H / DIA / X

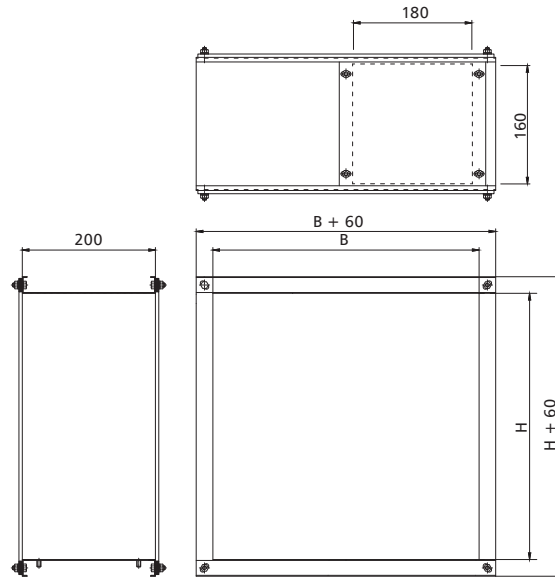


- X – material
- [no symbol] – galvanized steel, Zn 275 g/m² coating
- KN – stainless steel
- KK – 1.4404 acid-proof steel

2.8.2 | Casing module with KRW-type inspection access

The casing modules with a KRW-type inspection access are made of sheet metal and equipped with connection flanges. The casing features an inspection access opening with a cover. The module enables to access the damper blade or a drive train quickly without having to dismantle the damper or the duct on which it is installed.

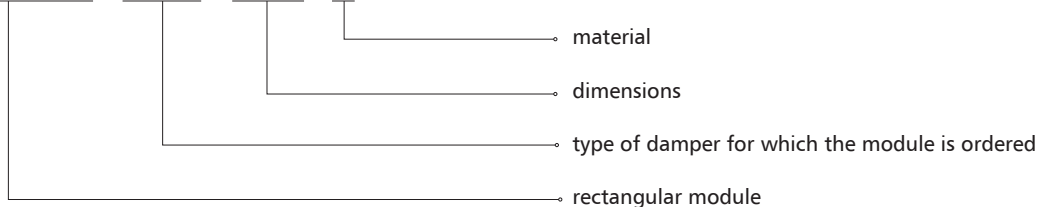
» **KRW P module for rectangular damper**



dimensions in [mm]

Marking:

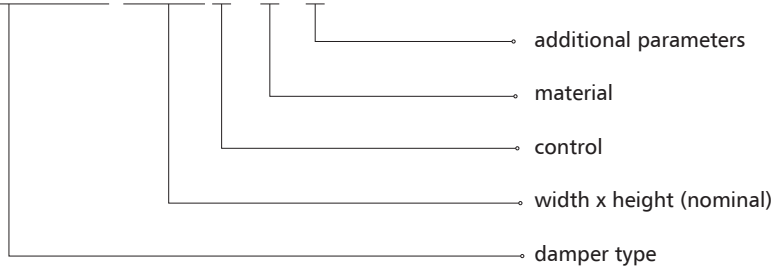
mcr KRW P / FID S / B x H / X



- X – material
- [no symbol] – galvanized steel, Zn 275 g/m² coating
- KN – stainless steel
- KK – 1.4404 acid-proof steel

2.9 | Marking

mcr FID S/S c/P B x H 1 / 2 / 3



1 - control:

» **RST trigger control mechanism**

- RST – thermal trigger
- RST/WK1 – thermal trigger + “pulse” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
- RST/WK2 – thermal trigger + “break” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade)

» **KW1 trigger control mechanism**

KW1/S – thermal trigger

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

KW1/24I/WK2 – thermal trigger + “pulse” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)

KW1/24P/WK2 – thermal trigger + “break” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)

KW1/24I/WK2 (+MP230/24) – thermal trigger + “pulse” electromagnetic trigger, U = 230 V AC

+ limit switch (open/closed blade signal)

KW1/24P/WK2 (+MP230/24) – thermal trigger + “break” electromagnetic trigger, U = 230 V AC

+ limit switch (open/closed blade signal)

» **trigger and control mechanism, axial actuator**

BF24TL-TN-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 / BFL24-SR-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

BFN 24-T / BFN 24-SR-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

MLF24T – actuator with a return spring, U = 24 V AC/DC

MLF230T – actuator with a return spring, U = 230 V AC

2 - material:

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

KN – stainless steel

KK – 1.4404 acid-proof steel

3 - additional parameters :

» **Thermoelectric and thermal triggers**

[no symbol] – 72°C trigger

ZBAT95 – thermoelectric trigger for 95°C

T2-95 (MLF) – thermoelectric trigger for 95°C

T93-95 – thermal trigger for 95°C

» **Control mechanism position**

[no symbol] – perpendicular to the damper rotation axis

WOK – along the damper rotation axis

» **Damper axis of rotation**

[no symbol] – horizontal axis of rotation

PP_D – vertical axis of rotation – mechanism at the bottom of the damper

PP_G – vertical axis of rotation - mechanism at the top of the damper

» **Design standard**

[no symbol] – right damper

KL – left damper

KO – inverted damper

» **Extended damper casing**

[no symbol] – standard casing length

400 – casing with a length of 400 mm

» **Installation bracket**

[no symbol] – no bracket

WM – installation bracket

NOTE: separate additional parameters entered with the “/” sign

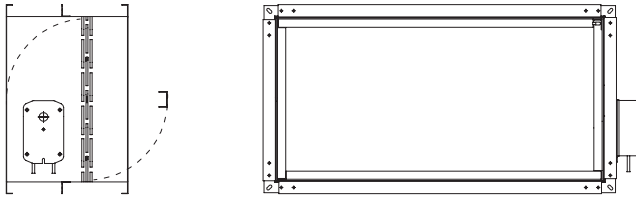
example marking:

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

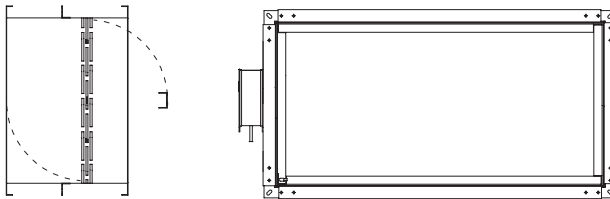
Low-resistance EIS120 cut-off damper with a 24 V actuator with limit switches.

2.9.1 | Design standard

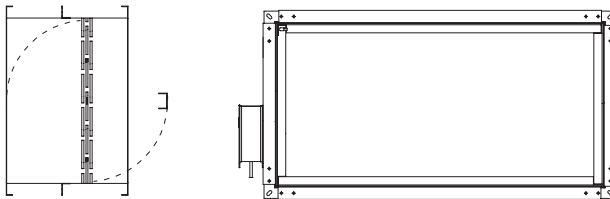
» right damper - standard



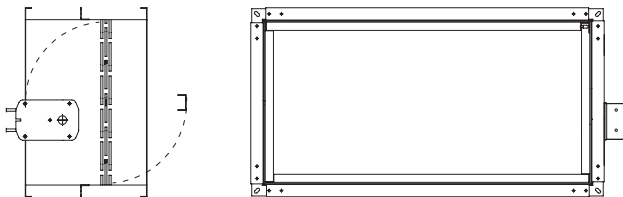
» inverted damper - (ducts facing downwards)



» left damper



» along the damper axis

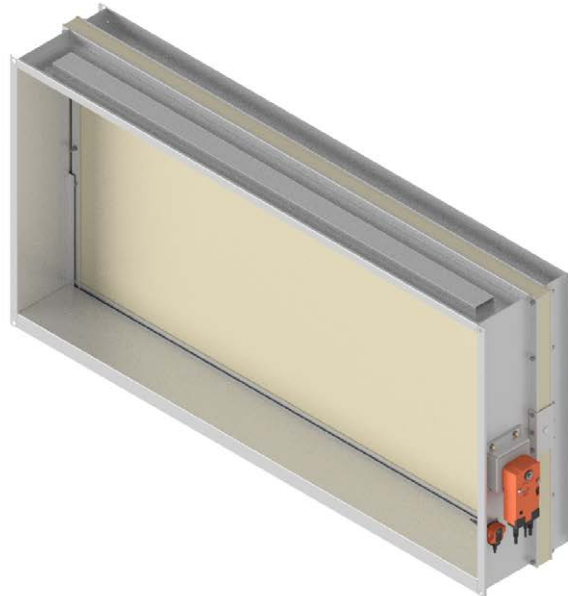


Chapter 16 - power supply and control (p. 262) contains the following information:
- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper.

mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems



downloadable models
on the website
under the designer zone tab



- » **EIS120**
- » Fire resistance class: EI120 (v_e h_o $i \leftrightarrow o$)S.
- » 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 a fire resistance rating independent of the airflow direction and installation side.
- » Dampers for rectangular and circular ventilation ducts
- » Certified installation of dampers in close proximity.
- » Certified installation of dampers at a distance from construction partitions.
- » Certified modular installation.
- » Admitted operation of a damper with a horizontal and vertical rotation axis.

3.1 | Application

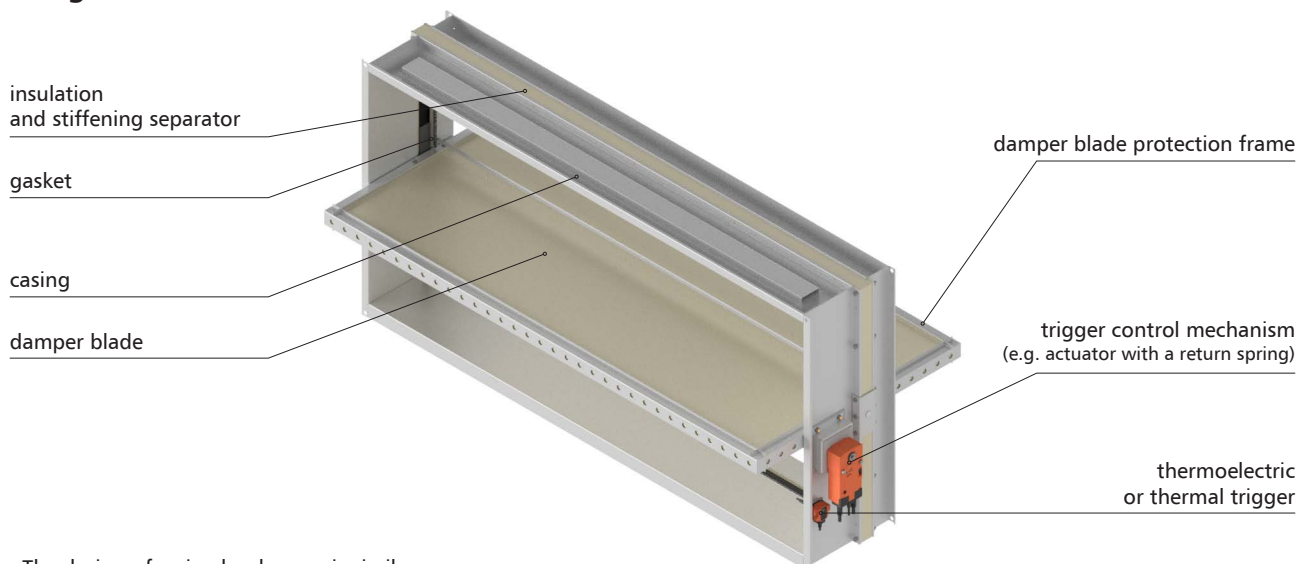
mcr FID S/S p/P, mcr FID S/S p/O cut-off dampers are designed for installation in general ventilation systems at installation passages through construction partitions.

During a fire, they preserve the fire resistance rating of the construction partition that the ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and fire gasses 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. Admissible flow velocity in the connected duct is 12 m/s.

In the version designed for explosion hazard zones (EX version), the dampers can be operated in gas explosion hazard zone 1 inside and outside ventilation ducts and in dust explosion hazard zone 21 outside these ducts. The dampers have been certified in compliance with the ATEX directive 94/9/EC and meet the requirements of group II category 2G and -/2D:

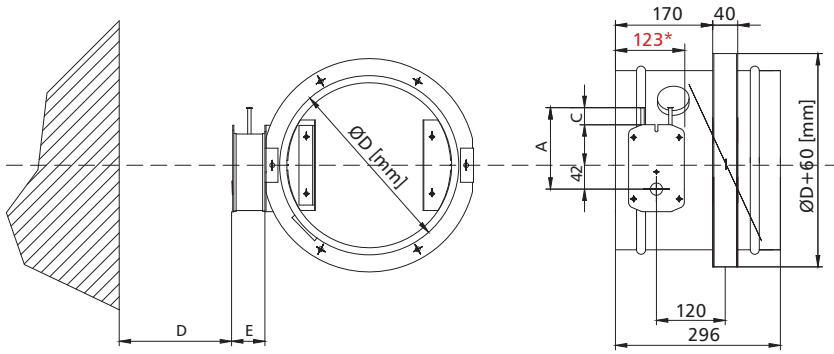
- » II 2G Ex h IIC T6 Gb
 - » II -/2D Ex h IIIC T72° -/Db
- Ambient temperature: T_a : -20° ... +50° C

3.2 | Design



» The design of a circular damper is similar.

mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems



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

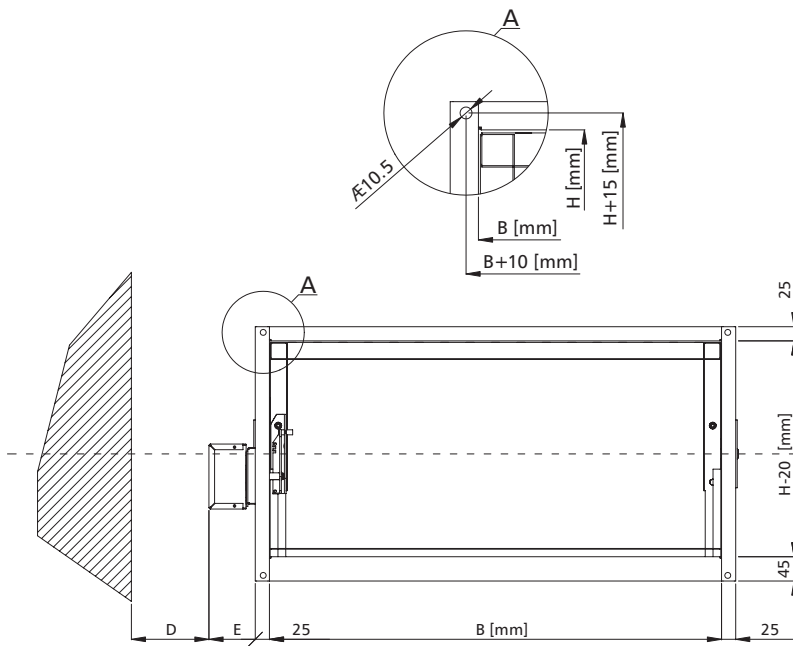
dimensions in [mm]

*embedding border

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

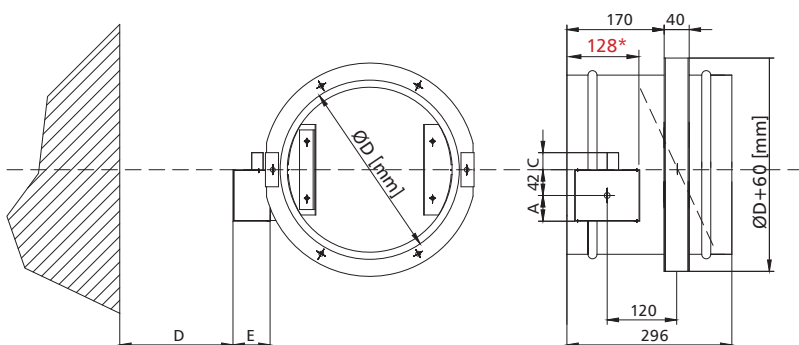
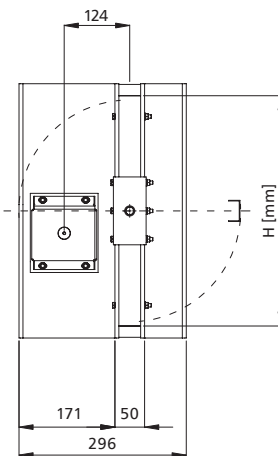
During normal operation, the fire damper blade remains open. In case of fire, the blade closes automatically.

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 74°C thermal trigger (optionally 95°C) is installed outside the damper mechanism, on the damper blade itself. Once the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. A mechanical blade position indicator is placed on the RST mechanism. It is possible to equip the damper with WK1 or WK2 limit switches used to signal the blade position.



mechanism	A	C	D	E
RST	50	30	75	75

*embedding border



mechanism	A	C	D	E
RST	40	30	75	55

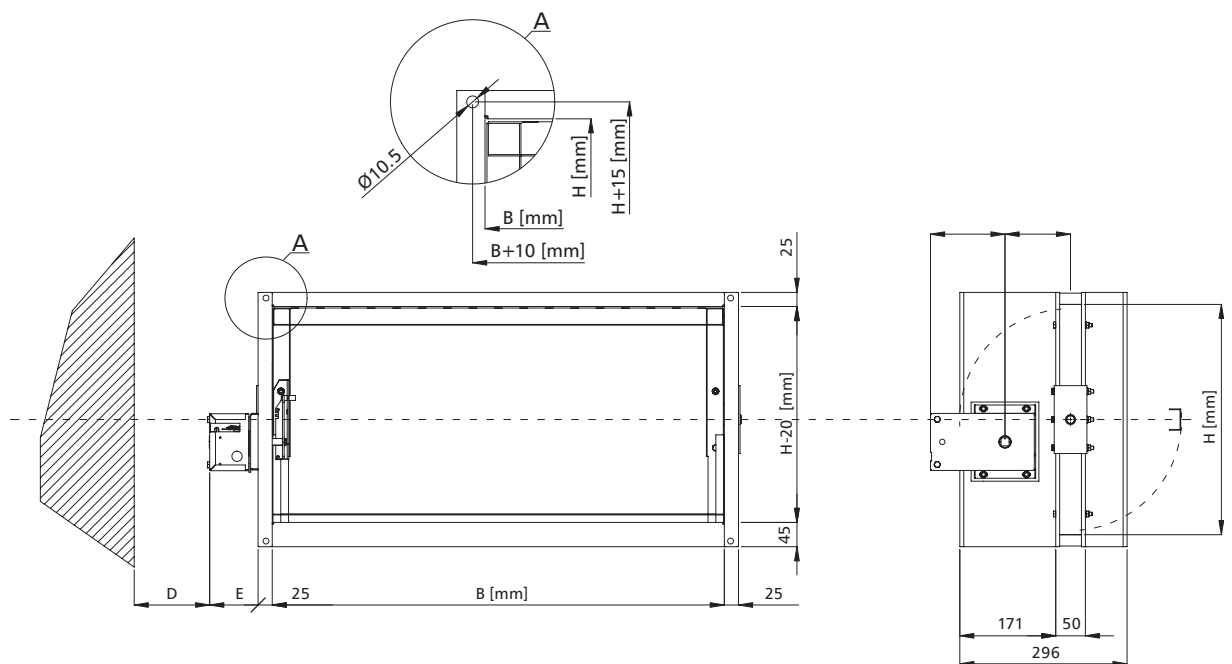
*embedding border

> mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems

3.3.3 | mcr FID S/S – 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.

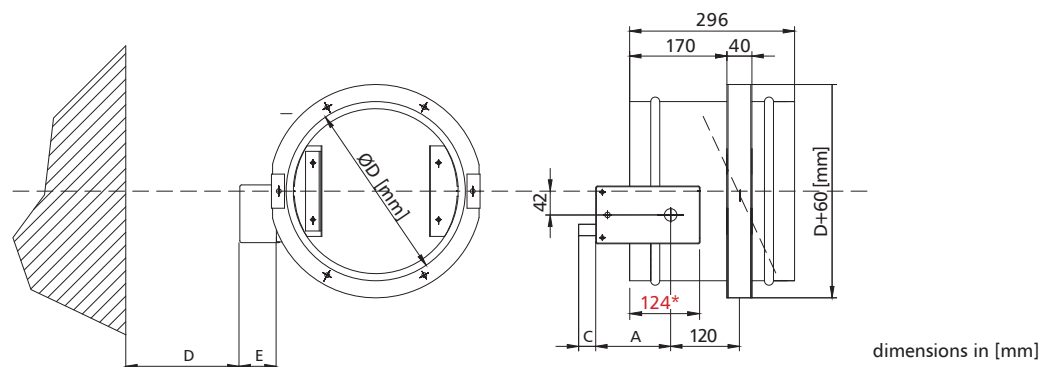
During normal operation, the fire damper blade remains open. In case of fire, the blade closes automatically or through the fire automation system in case of a damper with an electromagnetic trigger.

mcr FID S/S dampers are equipped with a KW1 trigger control mechanism with a drive spring and a cam-lever system. A 74°C thermal trigger (optionally 95°C) is integrated into the damper mechanism. Once the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. A mechanical blade position indicator is placed on the KW1 mechanism. 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. The mechanism features a test and blade button-release functions. Blade re-opening is activated manually. It is not required to dismantle the system to replace the thermal trigger. The KW1 mechanism may be replaced with an electric actuator.



mechanism	A	C	D	E
KW1	130	30	75	85

*embedding border



dimensions in [mm]

mechanism	A	C	D	E
KW1	130	30	75	65

*embedding border

3.4 | Dimensions

rectangular dampers:

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

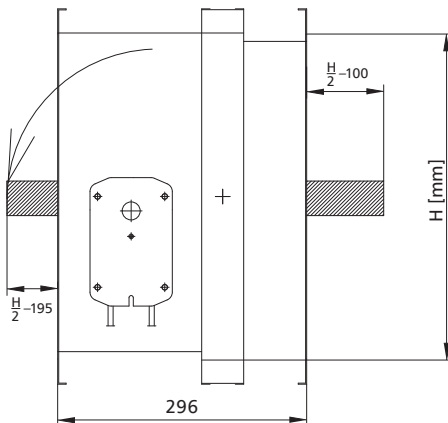
Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges).

circular dampers:

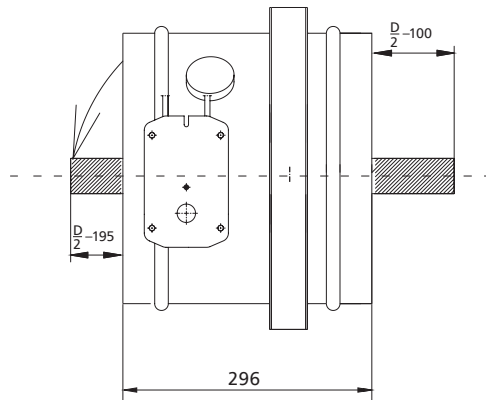
- » nominal diameter D from 250 mm to 630 mm

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

» mcr FID S/S p/P fire damper



» mcr FID S/S p/O fire damper



dimensions in [mm]

3.5 | Installation

mcr FID S/S p/P rectangular dampers have been rated as EI120(v_e h_o i↔o)S class. These dampers may be installed in the following partitions:

- » light walls/shafts made of gypsum boards with a min. thickness of 125 mm;
- » rigid walls/shafts made of blocks or hollow bricks with a min. thickness of 110 mm;
- » solid walls/shafts with a min. thickness of 110 mm;
- » solid floor slabs with a min. thickness of 150 mm.

Dampers may be installed at a distance to the vertical construction partitions, using fire-proof boards providing a fire resistance rating no lesser that the fire resistance rating of the partition.

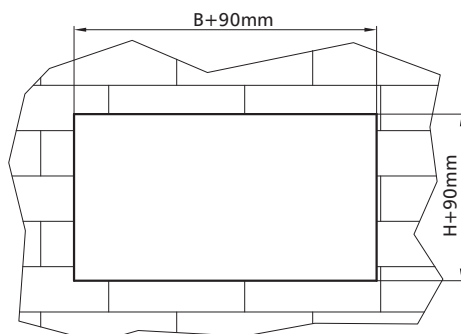
Dampers may be installed in vertical construction partitions with small distance between the dampers, equal to 60 mm.

mcr FID S/S p/O circular dampers have been rated as EI120(v_e h_o i↔o)S class. These dampers may be installed in the following partitions:

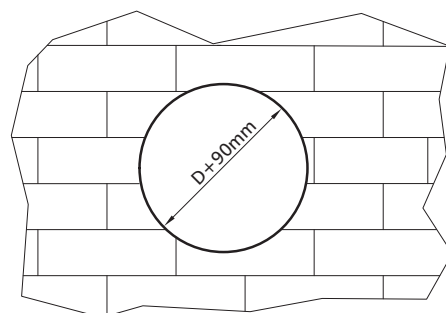
- » light walls/shafts made of gypsum boards with a min. thickness of 125 mm;
- » rigid walls/shafts made of blocks or hollow bricks with a min. thickness of 110 mm;
- » solid walls/shafts with a min. thickness of 110 mm;
- » solid floor slabs with a min. thickness of 150 mm.

3.5.1 | Preparation of installation openings

» mcr FID S/S p/P fire damper – preferred opening

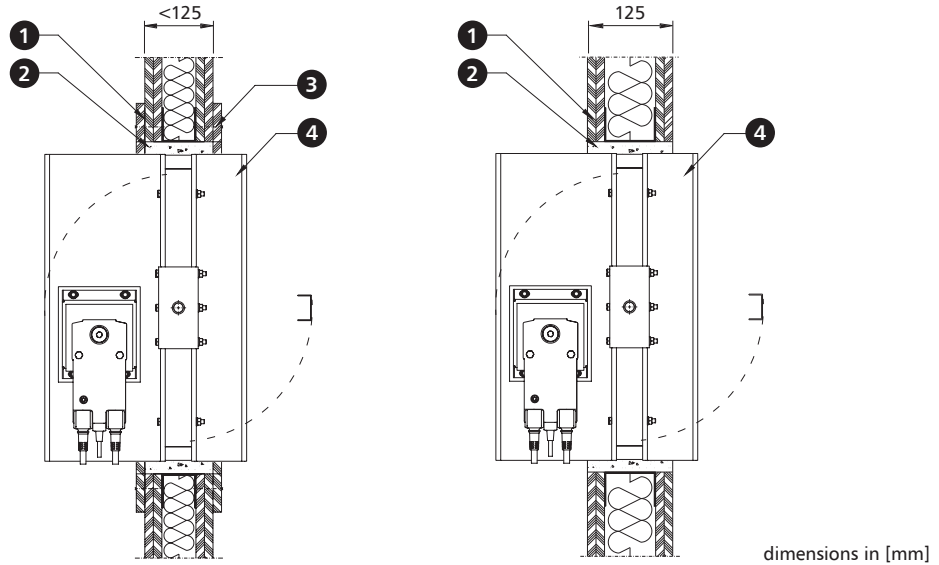


» mcr FID S/S p/O fire damper – preferred opening



3.5.2 | Sample installation in gypsum board light walls

» mcr FID S/S p/P fire damper



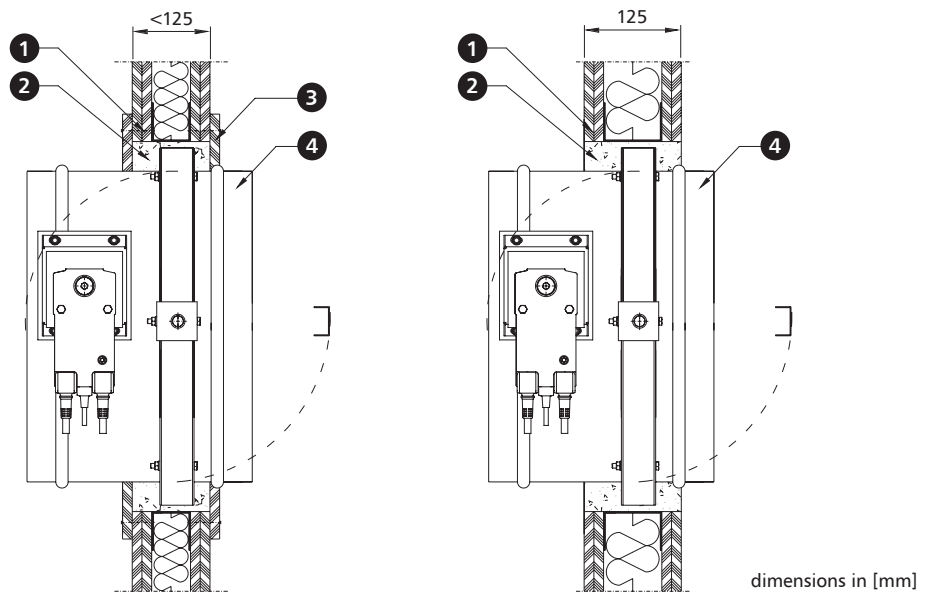
- 1. light wall
- 2. sealing - gypsum mortar*

- 3. circumferential gypsum board trim
- 4. mcr FID S/S p/P fire damper

* The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 125 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.

» mcr FID S/S p/O fire damper



- 1. light wall
- 2. sealing - gypsum mortar*

- 3. circumferential gypsum board trim
- 4. mcr FID S/S p/P fire damper

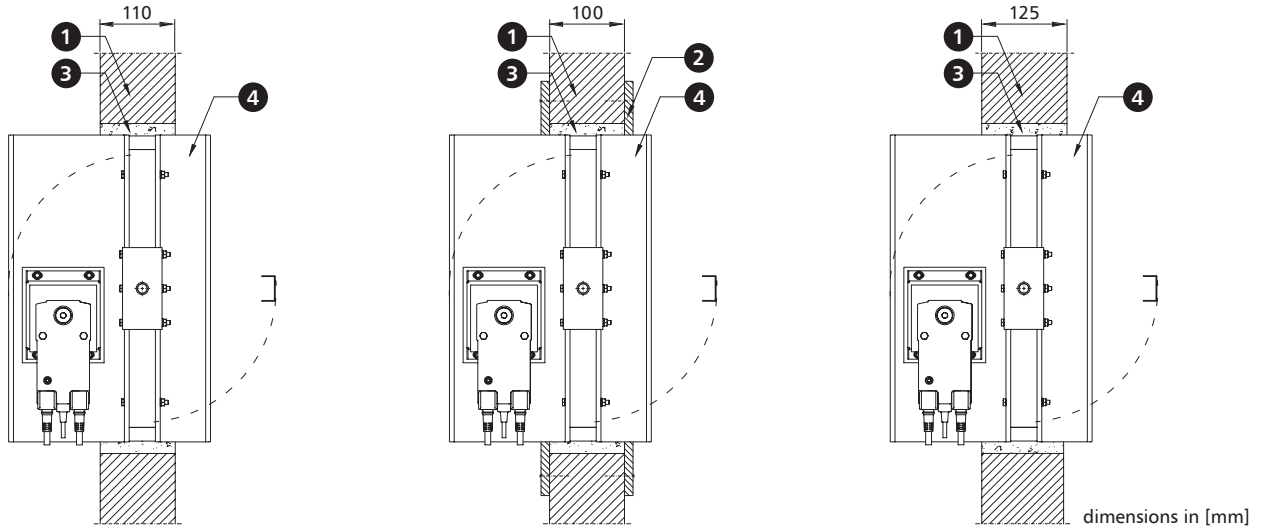
* The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 125 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.

mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems

3.5.3 | Sample installation in concrete and brick walls

» mcr FID S/S p/P fire damper



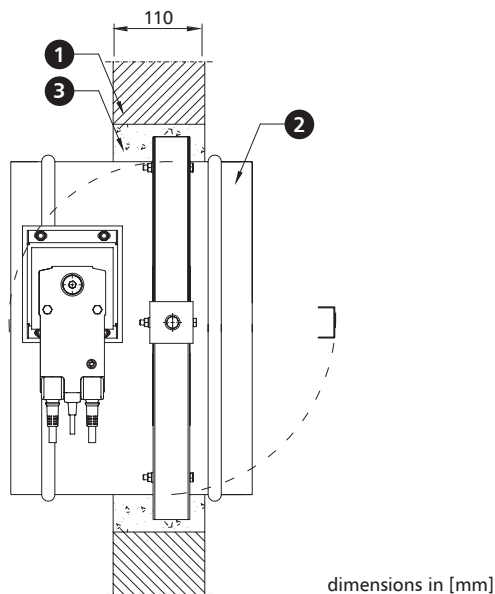
- 1. rigid wall - concrete, aerated concrete or bricks
- 2. circumferential gypsum board trim

- 3. sealing - concrete, cement or cement-lime masonry mortar*
- 4. mcr FID S/S p/P fire damper

*The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 110 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.

» mcr FID S/S p/O fire damper



- 1. rigid wall - concrete, aerated concrete or bricks
- 2. mcr FID S/S p/O fire damper

- 3. sealing - concrete, cement or cement-lime masonry mortar*

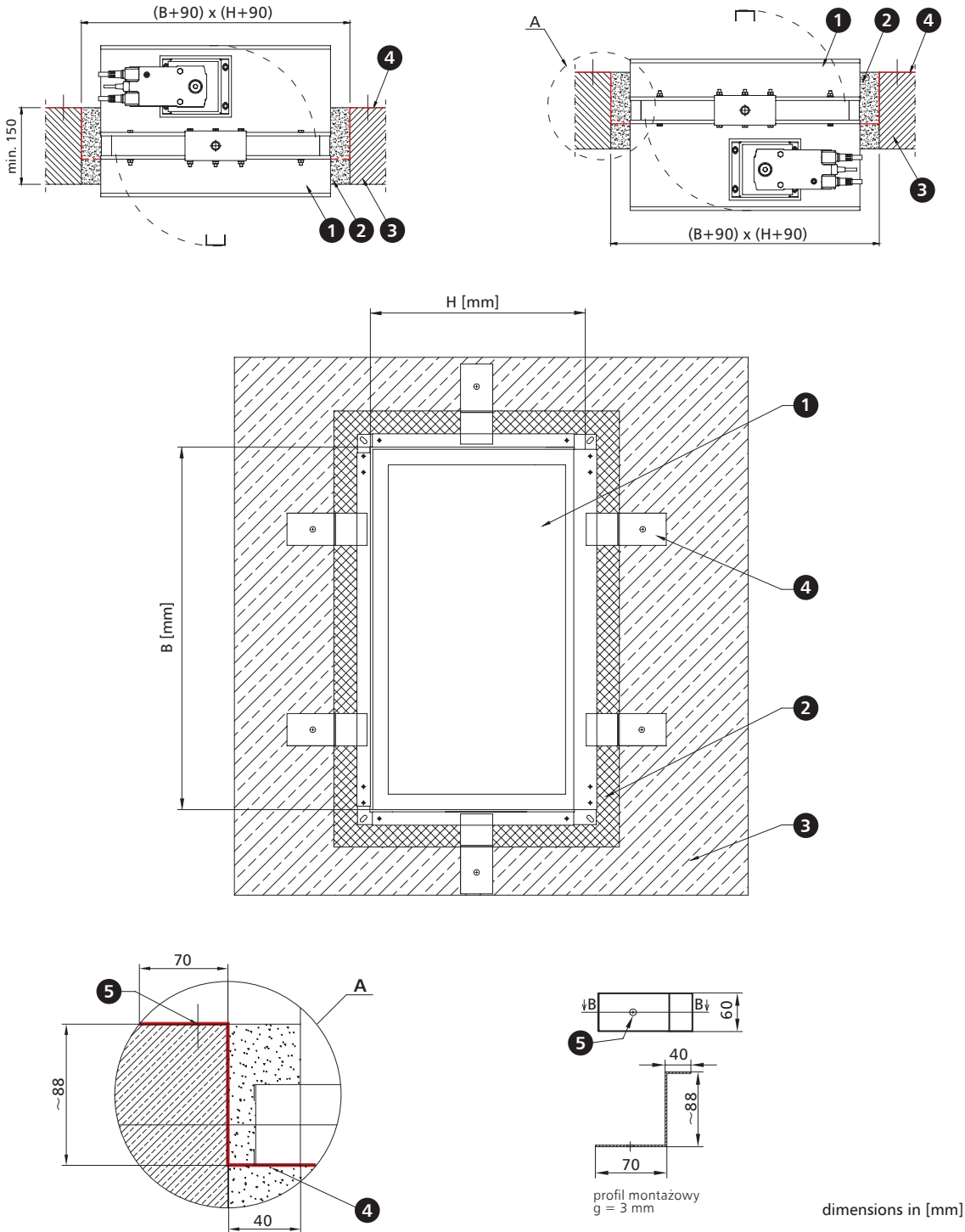
* The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 110 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.

mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems

3.5.4 | Sample installation in floor slabs

» mcr FID S/S p/P fire damper



1. mcr FID S/S p/P fire damper
2. sealing - concrete, cement or cement-lime masonry mortar*
3. floor slab

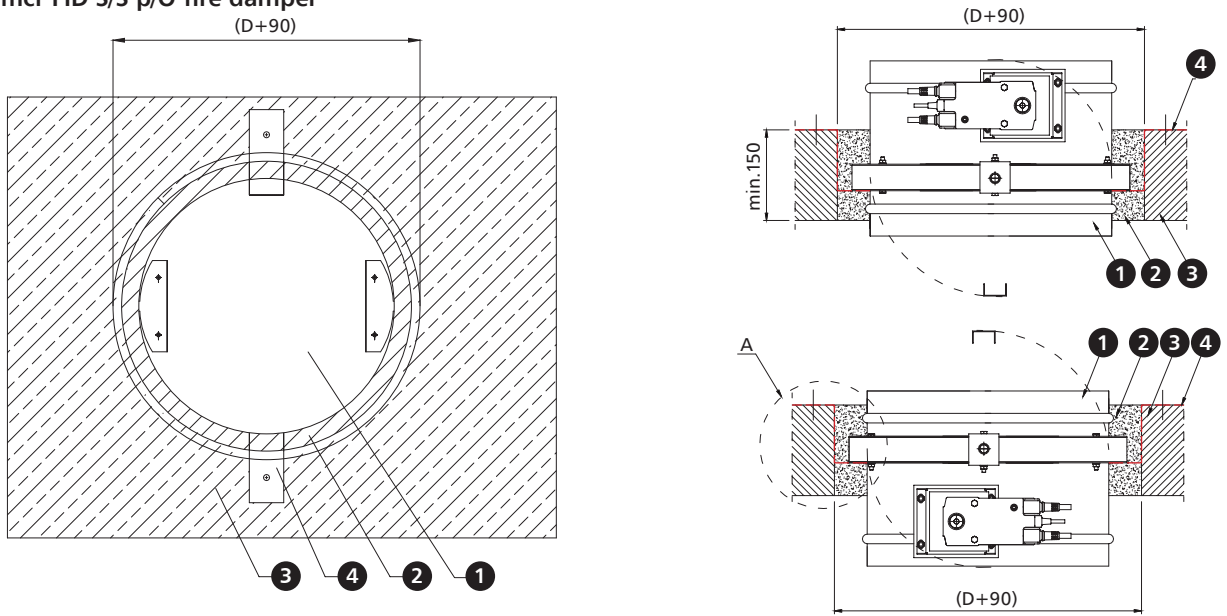
4. installation profile $g = 3 \text{ mm}$
5. steel expansion plug

* The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the applied

NOTE: If the damper is installed in a floor slab with a thickness of less than 150 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.

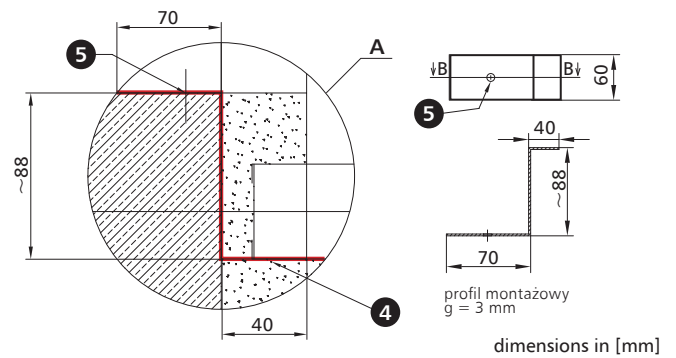
mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems

» mcr FID S/S p/O fire damper (D+90)



1. mcr FID S/S p/O fire damper
2. sealing - concrete, cement or cement-lime masonry mortar*
3. floor slab
4. installation profile $g = 3 \text{ mm}$
5. steel expansion plug

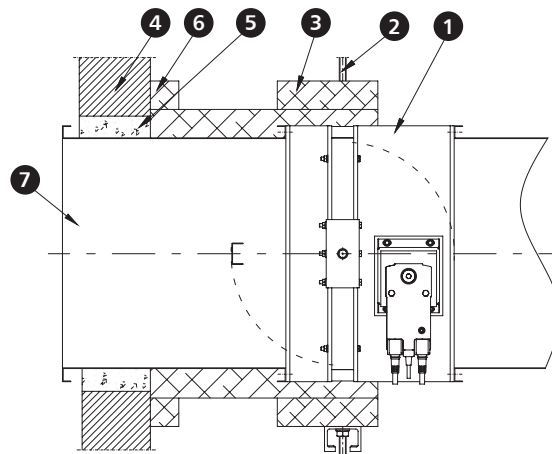
* The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.



NOTE: If the damper is installed in a floor slab with a thickness of less than 150 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.

3.5.5 | Sample installation at a distance to the construction partition

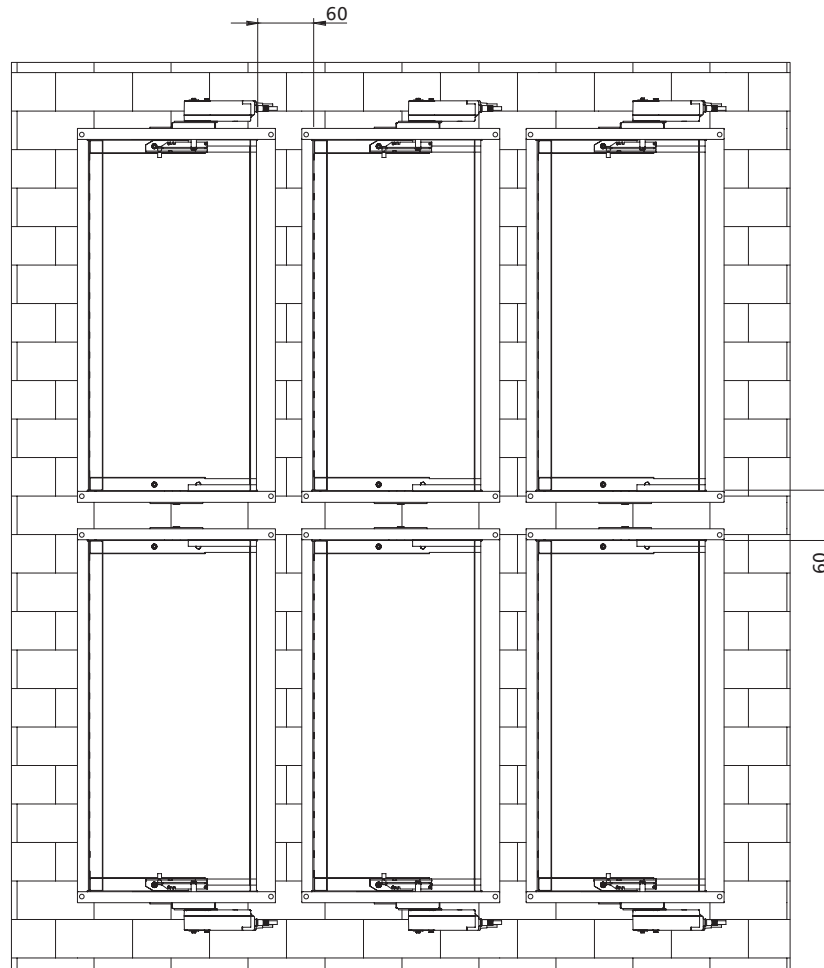
» mcr FID S/S p/P fire damper



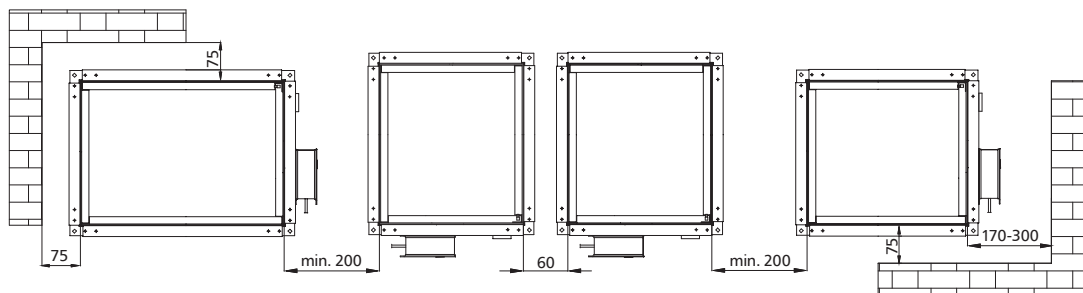
1. mcr FID S/S p/P fire damper
2. installation hangers system
3. duct and damper casing – e.g. made of fire-proof boards
4. wall
5. fireproof duct installation penetration system
6. a strip of fire-proof board along the entire length of the BxH side
7. steel ventilation duct

3.5.6 | Sample modular installation – close installation

» mcr FID S/S p/P fire damper



Distance between systems and partitions



dimensions in [mm]

Distances between the dampers in PP_G and PP_D configuration may be ≥ 60 mm; if the installation documentation does not provide otherwise, the minimum spacing between the casings of two fire dampers is ≥ 200 mm and ≥ 75 mm between the wall or floor slab, as per the EN-1366-2 standard.

Damper installation with a vertical axis of rotation

Such installation must be clearly stated in the draft documentation and reported to the damper's manufacturer in the order. BxH damper dimensions should be provided in a manner similar to the damper with a horizontal rotation axis.

mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems

3.6.1 | mcr FID S/S p/P rectangular dampers technical parameters

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		200					250					300					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4	0.040	0.029	420	8	29	0.050	0.039	564	7	28	0.06	0.049	708	7	29
		6			631	19	40			847	17	40			1 063	16	40
		8			841	34	48			1 129	31	48			1 417	29	48
		10			1 051	54	54			1 411	49	54			1 771	45	54
	250	4	0.050	0.037	526	8	30	0.063	0.049	706	7	29	0.075	0.062	886	7	30
		6			788	19	41			1 058	17	41			1 328	16	41
		8			1 051	34	49			1 411	31	49			1 771	29	49
		10			1 314	54	55			1 764	49	55			2 214	45	54
	300	4	0.060	0.044	631	8	31	0.075	0.059	847	7	30	0.09	0.074	1 063	7	31
		6			946	19	42			1 270	17	42			1 594	16	42
		8			1 261	34	49			1 693	31	49			2 125	28	49
		10			1 577	54	55			2 117	48	55			2 657	45	55
	350	4	0.070	0.051	736	8	31	0.088	0.069	988	7	31	0.105	0.086	1 240	7	32
		6			1 104	19	42			1 482	17	42			1 860	16	42
		8			1 472	34	50			1 976	31	50			2 480	28	50
		10			1 840	53	56			2 470	48	56			3 100	44	56
	400	4	0.080	0.058	841	8	32	0.100	0.078	1 129	7	31	0.12	0.098	1 417	7	32
		6			1 261	19	43			1 693	17	43			2 125	15	42
		8			1 682	34	51			2 258	30	50			2 834	28	50
		10			2 102	53	56			2 822	48	56			3 542	44	56
	450	4	0.090	0.066	946	8	32	0.113	0.088	1 270	7	32	0.135	0.111	1 594	7	33
		6			1 419	19	44			1 905	17	43			2 391	15	43
		8			1 892	33	51			2 540	30	51			3 188	28	51
		10			2 365	53	57			3 175	47	57			3 985	43	56
	500	4	0.100	0.073	1 051	8	33	0.125	0.098	1 411	7	32	0.15	0.123	1 771	6	31
		6			1 577	18	43			2 117	16	43			2 657	15	43
		8			2 102	33	51			2 822	30	51			3 542	27	51
		10			2 628	52	57			3 528	47	57			4 428	43	57
550	4	0.110	0.080	1 156	8	33	0.138	0.108	1 552	7	33	0.165	0.135	1 948	6	32	
	6			1 734	18	44			2 328	16	43			2 922	15	44	
	8			2 313	33	52			3 105	29	51			3 897	27	51	
	10			2 891	51	57			3 881	46	57			4 871	42	57	
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	32	
	6			1 892	18	44			2 540	16	44			3 188	15	44	
	8			2 523	32	52			3 387	29	52			4 251	26	51	
	10			3 154	51	58			4 234	45	57			5 314	41	57	
650	4	0.130	0.095	1 367	8	34	0.163	0.127	1 835	7	33	0.195	0.160	2 303	6	32	
	6			2 050	18	44			2 752	16	44			3 454	14	43	
	8			2 733	32	52			3 669	28	51			4 605	26	51	
	10			3 416	50	58			4 586	44	57			5 756	40	57	
700	4	0.140	0.102	1 472	7	32	0.175	0.137	1 976	7	34	0.21	0.172	2 480	6	33	
	6			2 208	17	44			2 964	15	44			3 720	14	44	
	8			2 943	31	52			3 951	28	52			4 959	25	51	
	10			3 679	49	58			4 939	44	58			6 199	40	57	

mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems

B – nominal width [mm]
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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		200					250					300					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	750	4	0.150	0.110	1 577	7	33	0.188	0.147	2 117	6	32	0.225	0.185	2 657	6	33
		6			2 365	17	44			3 175	15	44			3 985	14	44
		8			3 154	31	52			4 234	27	52			5 314	25	52
		10			3 942	48	58			5 292	43	58			6 642	39	57
	800	4	0.160	0.117	1 682	7	33	0.200	0.157	2 258	6	32	0.24	0.197	2 834	6	33
		6			2 523	17	45			3 387	15	44			4 251	13	43
		8			3 364	30	52			4 516	27	52			5 668	24	51
		10			4 205	47	58			5 645	42	58			7 085	38	57
	850	4	0.170	0.124	1 787	7	33	0.213	0.167	2 399	6	33	0.255	0.209	3 011	5	31
		6			2 681	16	44			3 599	14	44			4 517	13	44
		8			3 574	29	52			4 798	26	52			6 022	23	51
		10			4 468	46	58			5 998	41	58			7 528	37	57
900	4	0.180	0.131	1 892	7	34	0.225	0.176	2 540	6	33	0.27	0.221	3 188	5	31	
	6			2 838	16	44			3 810	14	44			4 782	13	44	
	8			3 784	29	52			5 080	25	51			6 376	23	51	
	10			4 730	45	58			6 350	40	58			7 970	36	57	
1000	4	0.200	0.146	2 102	7	34	0.250	0.196	2 822	6	33	0.3	0.246	3 542	5	32	
	6			3 154	15	44			4 234	13	43			5 314	12	43	
	8			4 205	28	52			5 645	24	51			7 085	22	51	
	10			5 256	43	58			7 056	38	57			8 856	34	57	
1100	4	0.220	0.161	2 313	6	32	0.275	0.216	3 105	5	31	0.33	0.271	3 897	5	32	
	6			3 469	15	44			4 657	13	44			5 845	11	43	
	8			4 625	26	52			6 209	23	51			7 793	20	50	
	10			5 782	41	57			7 762	36	57			9 742	32	56	
1200	4	0.240	0.175	2 523	6	33	0.300	0.235	3 387	5	32	0.36	0.295	4 251	4	30	
	6			3 784	14	44			5 080	12	43			6 376	11	43	
	8			5 046	25	51			6 774	22	51			8 502	19	50	
	10			6 307	39	57			8 467	34	57			10 627	30	56	
1300	4	0.260	0.190	2 733	5	31	0.325	0.255	3 669	5	32	0.39	0.320	4 605	4	30	
	6			4 100	13	43			5 504	11	42			6 908	10	42	
	8			5 466	23	51			7 338	20	50			9 210	18	50	
	10			6 833	37	57			9 173	32	56			11 513	28	55	
1400	4	0.280	0.204	2 943	5	31	0.350	0.274	3 951	4	29	0.42	0.344	4 959	4	30	
	6			4 415	12	42			5 927	10	41			7 439	9	41	
	8			5 887	22	50			7 903	19	50			9 919	17	49	
	10			7 358	35	56			9 878	30	56			12 398	27	55	
1500	4	0.300	0.219	3 154	5	31	0.375	0.294	4 234	4	30	0.45	0.369	5 314	4	31	
	6			4 730	12	43			6 350	10	42			7 970	9	41	
	8			6 307	21	50			8 467	18	49			10 627	16	49	
	10			7 884	33	56			10 584	28	55			13 284	25	55	

mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		350					400					450					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4	0.070	0.059	852	6	28	0.080	0.069	996	6	29	0.090	0.079	1 140	6	29
		6			1 279	15	40			1 495	14	40			1 711	13	39
		8			1 705	27	48			1 993	25	47			2 281	24	47
		10			2 131	42	53			2 491	40	53			2 851	38	53
	250	4	0.088	0.074	1 066	6	29	0.100	0.087	1 246	6	30	0.113	0.099	1 426	6	30
		6			1 598	15	41			1 868	14	41			2 138	13	40
		8			2 131	27	49			2 491	25	48			2 851	24	48
		10			2 664	42	54			3 114	40	54			3 564	38	54
	300	4	0.105	0.089	1 279	6	30	0.120	0.104	1 495	6	31	0.135	0.119	1 711	6	31
		6			1 918	15	42			2 242	14	42			2 566	13	41
		8			2 557	27	49			2 989	25	49			3 421	24	49
		10			3 197	42	55			3 737	39	55			4 277	37	55
350	4	0.123	0.104	1 492	6	30	0.140	0.121	1 744	6	31	0.158	0.139	1 996	5	29	
	6			2 238	15	42			2 616	14	42			2 994	13	42	
	8			2 984	26	50			3 488	25	50			3 992	23	49	
	10			3 730	41	56			4 360	39	56			4 990	37	55	
400	4	0.140	0.118	1 705	6	31	0.160	0.138	1 993	6	32	0.180	0.158	2 281	5	30	
	6			2 557	14	42			2 989	13	42			3 421	13	42	
	8			3 410	26	50			3 986	24	50			4 562	23	50	
	10			4 262	41	56			4 982	38	56			5 702	36	56	
450	4	0.158	0.133	1 918	6	32	0.180	0.156	2 242	6	32	0.203	0.178	2 566	5	30	
	6			2 877	14	43			3 363	13	42			3 849	13	43	
	8			3 836	26	51			4 484	24	50			5 132	23	50	
	10			4 795	40	56			5 605	38	56			6 415	36	56	
500	4	0.175	0.148	2 131	6	32	0.200	0.173	2 491	6	33	0.225	0.198	2 851	5	31	
	6			3 197	14	43			3 737	13	43			4 277	12	42	
	8			4 262	25	51			4 982	24	51			5 702	22	50	
	10			5 328	40	57			6 228	37	56			7 128	35	56	
550	4	0.193	0.163	2 557	6	32	0.220	0.190	2 740	5	31	0.248	0.218	3 136	5	31	
	6			3 836	14	44			4 110	13	43			4 704	12	43	
	8			5 115	25	51			5 481	23	51			6 273	22	51	
	10			6 394	39	57			6 851	36	56			7 841	34	56	
600	4	0.210	0.178	2 557	6	33	0.240	0.208	2 989	5	31	0.270	0.238	3 421	5	32	
	6			3 836	13	43			4 484	13	44			5 132	12	43	
	8			5 115	24	51			5 979	23	51			6 843	21	50	
	10			6 394	38	57			7 474	36	57			8 554	34	57	
650	4	0.228	0.192	2 771	6	33	0.260	0.225	3 239	5	31	0.293	0.257	3 707	5	32	
	6			4 156	13	43			4 858	12	43			5 560	11	42	
	8			5 541	24	51			6 477	22	51			7 413	21	51	
	10			6 926	37	57			8 096	35	57			9 266	33	57	
700	4	0.245	0.207	2 984	5	31	0.28	0.242	3 488	5	32	0.315	0.277	3 992	5	32	
	6			4 476	13	44			5 232	12	43			5 988	11	43	
	8			5 967	23	51			6 975	22	51			7 983	20	50	
	10			7 459	37	57			8 719	34	57			9 979	32	57	

mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems

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d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		350					400					450					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	750	4	0.263	0.222	3 197	5	31	0.3	0.260	3 737	5	32	0.338	0.297	4 277	5	33
		6			4 795	13	44			5 605	12	44			6 415	11	43
		8			6 394	23	51			7 474	21	51			8 554	20	51
		10			7 992	36	57			9 342	33	57			10 692	31	56
	800	4	0.280	0.237	3 410	5	32	0.32	0.277	3 986	5	32	0.360	0.317	4 562	4	29
		6			5 115	12	43			5 979	11	43			6 843	11	42
		8			6 820	22	51			7 972	21	51			9 124	19	49
		10			8 525	35	57			9 965	32	57			11 405	30	55
	850	4	0.298	0.252	3 623	5	32	0.34	0.294	4 235	5	33	0.383	0.337	4 847	4	29
		6			5 435	12	43			6 353	11	43			7 271	10	41
		8			7 246	22	51			8 470	20	51			9 694	19	49
		10			9 058	34	57			10 588	31	56			12 118	29	55
900	4	0.315	0.266	3 836	5	32	0.360	0.311	4 484	4	30	0.405	0.356	5 132	4	29	
	6			5 754	12	44			6 726	11	43			7 698	10	41	
	8			7 672	21	51			8 968	19	50			10 264	18	49	
	10			9 590	33	57			11 210	31	57			12 830	29	55	
1000	4	0.350	0.296	4 262	5	33	0.400	0.346	4 982	4	30	0.450	0.396	5 702	4	29	
	6			6 394	11	43			7 474	10	42			8 554	9	40	
	8			8 525	20	51			9 965	18	50			11 405	17	48	
	10			10 656	31	56			12 456	29	56			14 256	27	54	
1100	4	0.385	0.326	4 689	4	30	0.440	0.381	5 481	4	31	0.495	0.436	6 273	4	29	
	6			7 033	10	42			8 221	9	41			9 409	9	40	
	8			9 377	19	50			10 961	17	50			12 545	16	47	
	10			11 722	29	56			13 702	27	56			15 682	25	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	3	25	
	6			7 672	10	43			8 968	9	42			10 264	8	38	
	8			10 230	17	49			11 958	16	49			13 686	15	46	
	10			12 787	27	55			14 947	25	55			17 107	23	52	
1300	4	0.455	0.385	5 541	4	31	0.520	0.450	6 477	3	28	0.585	0.515	7 413	3	25	
	6			8 312	9	41			9 716	8	41			11 120	8	38	
	8			11 082	16	49			12 954	15	49			14 826	14	45	
	10			13 853	26	55			16 193	24	55			18 533	22	51	
1400	4	0.490	0.414	5 967	3	27	0.560	0.484	6 975	3	28	0.630	0.554	7 983	3	25	
	6			8 951	8	40			10 463	8	41			11 975	7	36	
	8			11 935	15	48			13 951	14	48			15 967	13	45	
	10			14 918	24	55			17 438	22	54			19 958	20	50	
1500	4	0.525	0.444	6 394	3	28	0.600	0.519	7 474	3	28	0.675	0.594	8 554	3	25	
	6			9 590	8	41			11 210	7	40			12 830	6	34	
	8			12 787	14	48			14 947	13	48			17 107	12	43	
	10			15 984	22	54			18 684	20	53			21 384	19	49	

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

		height H [mm]															
		500					550					600					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4	0.1	0.089	1 284	5	27	0.110	0.099	1 428	5	28	0.120	0.109	1 572	5	28
		6			1 927	13	40			2 143	12	39			2 359	12	40
		8			2 569	23	47			2 857	22	47			3 145	21	47
		10			3 211	36	53			3 571	35	53			3 931	34	53
	250	4	0.125	0.112	1 606	5	28	0.138	0.124	1 786	5	29	0.150	0.137	1 966	5	29
		6			2 408	13	41			2 678	12	40			2 948	12	41
		8			3 211	23	48			3 571	22	48			3 931	21	48
		10			4 014	36	54			4 464	35	54			4 914	33	54
	300	4	0.15	0.134	1 927	5	29	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	23	49			4 285	22	49			4 717	21	49
		10			4 817	36	55			5 357	34	55			5 897	33	55
	350	4	0.175	0.156	2 248	5	30	0.193	0.174	2 500	5	30	0.210	0.191	2 752	5	31
		6			3 372	12	41			3 750	12	42			4 128	11	41
		8			4 496	22	49			5 000	21	49			5 504	20	49
		10			5 620	35	55			6 250	34	55			6 880	32	55
	400	4	0.2	0.178	2 569	5	30	0.220	0.198	2 857	5	31	0.240	0.218	3 145	5	31
		6			3 853	12	42			4 285	12	42			4 717	11	42
		8			5 138	22	50			5 714	21	50			6 290	20	49
		10			6 422	35	56			7 142	33	56			7 862	32	56
	450	4	0.225	0.201	2 890	5	31	0.248	0.223	3 214	5	31	0.270	0.246	3 538	5	32
		6			4 335	12	42			4 821	11	42			5 307	11	42
		8			5 780	22	50			6 428	21	50			7 076	20	50
		10			7 225	34	56			8 035	32	56			8 845	31	56
	500	4	0.250	0.223	3 211	5	31	0.275	0.248	3 571	5	32	0.300	0.273	3 931	4	29
		6			4 817	12	43			5 357	11	42			5 897	11	43
		8			6 422	21	50			7 142	20	50			7 862	19	50
		10			8 028	33	56			8 928	32	56			9 828	30	56
550	4	0.275	0.245	3 853	5	32	0.303	0.273	4 285	5	32	0.330	0.300	4 717	4	30	
	6			5 780	11	42			6 428	11	43			7 076	10	42	
	8			7 707	21	51			8 571	20	50			9 435	19	50	
	10			9 634	33	56			10 714	31	56			11 794	30	56	
600	4	0.3	0.268	3 853	5	32	0.330	0.298	4 285	4	30	0.360	0.328	4 717	4	30	
	6			5 780	11	43			6 428	11	43			7 076	10	42	
	8			7 707	20	50			8 571	19	50			9 435	18	50	
	10			9 634	32	56			10 714	30	56			11 794	29	56	
650	4	0.325	0.290	4 175	5	33	0.358	0.322	4 643	4	30	0.390	0.355	5 111	4	31	
	6			6 262	11	43			6 964	10	42			7 666	10	43	
	8			8 349	20	51			9 285	19	50			10 221	18	50	
	10			10 436	31	56			11 606	30	56			12 776	28	56	
700	4	0.350	0.312	4 496	4	30	0.385	0.347	5 000	4	30	0.420	0.382	5 504	4	31	
	6			6 744	11	43			7 500	10	42			8 256	10	43	
	8			8 991	19	50			9 999	18	50			11 007	17	50	
	10			11 239	30	56			12 499	29	56			13 759	27	56	

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		height H [mm]															
		500					550					600					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	750	4	0.375	0.335	4 817	4	30	0.413	0.372	5 357	4	31	0.450	0.410	5 897	4	31
		6			7 225	10	42			8 035	10	43			8 845	9	42
		8			9 634	19	51			10 714	18	50			11 794	17	50
		10			12 042	29	56			13 392	28	56			14 742	27	56
	800	4	0.4	0.357	5 138	4	30	0.440	0.397	5 714	4	31	0.480	0.437	6 290	4	31
		6			7 707	10	42			8 571	9	42			9 435	9	42
		8			10 276	18	50			11 428	17	50			12 580	16	50
		10			12 845	29	56			14 285	27	56			15 725	26	56
	850	4	0.425	0.379	5 459	4	30	0.468	0.422	6 071	4	31	0.510	0.464	6 683	4	32
		6			8 189	10	42			9 107	9	42			10 025	9	42
		8			10 918	18	50			12 142	17	50			13 366	16	50
		10			13 648	28	56			15 178	26	56			16 708	25	56
900	4	0.45	0.401	5 780	4	30	0.495	0.446	6 428	4	32	0.540	0.491	7 076	3	28	
	6			8 670	9	41			9 642	9	42			10 614	8	39	
	8			11 560	17	49			12 856	16	50			14 152	15	47	
	10			14 450	27	55			16 070	25	55			17 690	24	52	
1000	4	0.5	0.446	6 422	4	30	0.550	0.496	6 428	3	28	0.600	0.546	7 862	3	29	
	6			9 634	9	41			9 642	8	41			11 794	8	41	
	8			12 845	16	48			12 856	15	49			15 725	14	49	
	10			16 056	25	54			16 070	24	55			19 656	23	55	
1100	4	0.55	0.491	7 065	3	27	0.605	0.546	7 857	3	29	0.660	0.601	8 649	3	29	
	6			10 597	8	39			11 785	8	41			12 973	7	40	
	8			14 129	15	48			15 713	14	49			17 297	13	48	
	10			17 662	24	54			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	29	0.720	0.655	9 435	3	29	
	6			11 560	8	39			12 856	7	40			14 152	7	41	
	8			15 414	14	47			17 142	13	48			18 870	12	48	
	10			19 267	22	53			21 427	21	54			23 587	20	54	
1300	4	0.65	0.580	8 349	3	27	0.715	0.645	9 285	3	29	0.780	0.710	10 221	2	25	
	6			12 524	7	38			13 928	7	40			15 332	6	39	
	8			16 698	13	46			18 570	12	47			20 442	11	47	
	10			20 873	20	51			23 213	19	53			25 553	18	53	
1400	4	0.7	0.624	8 991	3	27	0.770	0.694	9 999	2	24	0.840	0.764	11 007	2	25	
	6			13 487	6	36			14 999	6	39			16 511	6	39	
	8			17 983	12	45			19 999	11	47			22 015	10	46	
	10			22 478	19	51			24 998	18	53			27 518	17	53	
1500	4	0.75	0.669	9 634	2	21	0.825	0.744	10 714	2	25	0.900	0.819	11 794	2	25	
	6			14 450	6	36			16 070	6	39			17 690	5	37	
	8			19 267	11	43			21 427	10	46			23 587	10	46	
	10			24 084	17	49			26 784	16	52			29 484	15	51	

mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems

B – nominal width [mm]
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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		650					700					750					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [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	4	26
		6			2 575	11	39			2 791	11	39			3 007	11	40
		8			3 433	21	47			3 721	20	47			4 009	19	47
		10			4 291	32	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	4	27
		6			3 218	11	40			3 488	11	40			3 758	11	41
		8			4 291	20	48			4 651	20	48			5 011	19	48
		10			5 364	32	54			5 814	31	54			6 264	30	54
	300	4	0.195	0.179	2 575	5	30	0.210	0.194	2 791	4	28	0.225	0.209	3 007	4	28
		6			3 862	11	41			4 186	11	41			4 510	10	40
		8			5 149	20	49			5 581	19	48			6 013	19	49
		10			6 437	32	55			6 977	31	55			7 517	30	55
350	4	0.228	0.209	3 004	5	31	0.245	0.226	3 256	4	29	0.263	0.244	3 508	4	29	
	6			4 506	11	41			4 884	11	42			5 262	10	41	
	8			6 008	20	49			6 512	19	49			7 016	18	49	
	10			7 510	31	55			8 140	30	55			8 770	29	55	
400	4	0.260	0.238	3 433	4	29	0.280	0.258	3 721	4	29	0.300	0.278	4 009	4	30	
	6			5 149	11	42			5 581	10	41			6 013	10	41	
	8			6 866	19	49			7 442	19	49			8 018	18	49	
	10			8 582	31	56			9 302	30	55			10 022	29	55	
450	4	0.293	0.268	3 862	4	29	0.315	0.291	4 186	4	30	0.338	0.313	4 510	4	30	
	6			5 793	10	41			6 279	10	42			6 765	10	42	
	8			7 724	19	50			8 372	18	49			9 020	18	50	
	10			9 655	30	56			10 465	29	56			11 275	28	55	
500	4	0.325	0.298	4 291	4	30	0.350	0.323	4 651	4	30	0.375	0.348	5 011	4	30	
	6			6 437	10	42			6 977	10	42			7 517	10	42	
	8			8 582	19	50			9 302	18	50			10 022	17	49	
	10			10 728	29	56			11 628	28	56			12 528	27	55	
550	4	0.358	0.328	5 149	4	30	0.385	0.355	5 116	4	31	0.413	0.383	5 512	4	31	
	6			7 724	10	42			7 674	10	43			8 268	9	41	
	8			10 299	18	50			10 233	17	49			11 025	17	50	
	10			12 874	29	56			12 791	28	56			13 781	27	56	
600	4	0.390	0.358	5 149	4	31	0.420	0.388	5 581	4	31	0.450	0.418	6 013	4	31	
	6			7 724	10	43			8 372	9	42			9 020	9	42	
	8			10 299	18	50			11 163	17	50			12 027	16	49	
	10			12 874	28	56			13 954	27	56			15 034	26	56	
650	4	0.423	0.387	5 579	4	31	0.455	0.420	6 047	4	31	0.488	0.452	6 515	4	32	
	6			8 368	9	42			9 070	9	42			9 772	9	42	
	8			11 157	17	50			12 093	17	50			13 029	16	50	
	10			13 946	27	56			15 116	26	56			16 286	25	55	
700	4	0.455	0.417	6 008	4	31	0.490	0.452	6 512	4	32	0.525	0.487	7 016	3	28	
	6			9 012	9	42			9 768	9	42			10 524	8	41	
	8			12 015	17	50			13 023	16	50			14 031	15	49	
	10			15 019	26	56			16 279	25	55			17 539	24	55	

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d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		650					700					750					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	750	4			6 437	4	32			6 977	4	32			7 517	3	28
		6	0.488	0.447	9 655	9	42	0.525	0.485	10 465	9	42	0.563	0.522	11 275	8	41
		8			12 874	16	50			13 954	16	50			15 034	15	49
		10			16 092	26	56			17 442	25	56			18 792	24	56
	800	4			6 866	4	32			7 442	3	26			8 018	3	29
		6	0.520	0.477	10 299	9	42	0.560	0.517	11 163	8	39	0.600	0.557	12 027	8	42
		8			13 732	16	50			14 884	15	47			16 036	14	49
		10			17 165	25	55			18 605	24	52			20 045	23	55
	850	4			7 295	3	28			7 907	3	29			8 519	3	29
		6	0.553	0.507	10 943	8	41	0.595	0.549	11 861	8	41	0.638	0.592	12 779	8	42
		8			14 590	15	49			15 814	15	50			17 038	14	49
		10			18 238	24	55			19 768	23	55			21 298	22	55
900	4			7 724	3	28			8 372	3	29			9 020	3	29	
	6	0.585	0.536	11 586	8	41	0.630	0.581	12 558	8	42	0.675	0.626	13 530	7	40	
	8			15 448	15	49			16 744	14	49			18 040	13	48	
	10			19 310	23	54			20 930	22	55			22 550	21	55	
1000	4			8 582	3	28			9 302	3	29			10 022	3	30	
	6	0.650	0.596	12 874	7	39	0.700	0.646	13 954	7	40	0.750	0.696	15 034	7	41	
	8			17 165	14	48			18 605	13	49			20 045	13	49	
	10			21 456	22	54			23 256	21	55			25 056	20	54	
1100	4			9 441	3	28			10 233	3	30			11 025	3	30	
	6	0.715	0.656	14 161	7	39	0.770	0.711	15 349	7	41	0.825	0.766	16 537	6	39	
	8			18 881	13	47			20 465	12	48			22 049	12	48	
	10			23 602	20	53			25 582	19	54			27 562	18	53	
1200	4			10 299	3	28			11 163	2	25			12 027	2	25	
	6	0.780	0.715	15 448	6	37	0.840	0.775	16 744	6	39	0.900	0.835	18 040	6	40	
	8			20 598	12	46			22 326	11	47			24 054	11	47	
	10			25 747	19	52			27 907	18	54			30 067	17	53	
1300	4			11 157	2	23			12 093	2	25			13 029	2	26	
	6	0.845	0.775	16 736	6	37	0.910	0.840	18 140	6	40	0.975	0.905	19 544	5	38	
	8			22 314	11	45			24 186	10	46			26 058	10	47	
	10			27 893	17	50			30 233	16	52			32 573	16	53	
1400	4			12 015	2	23			13 023	2	26			14 031	2	26	
	6	0.910	0.834	18 023	5	34	0.980	0.904	19 535	5	38	1.050	0.974	21 047	5	38	
	8			24 031	10	44			26 047	9	45			28 063	9	46	
	10			30 038	16	50			32 558	15	52			35 078	14	51	
1500	4			12 874	2	23			13 954	2	26			15 034	2	26	
	6	0.975	0.894	19 310	5	34	1.050	0.969	20 930	5	38	1.125	1.044	22 550	4	35	
	8			25 747	9	42			27 907	9	45			30 067	8	44	
	10			32 184	14	48			34 884	14	51			37 584	13	51	

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

		height H [mm]															
		800					850					900					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4	0.160	0.149	2 148	4	27	0.170	0.159	2 292	4	27	0.180	0.169	2 436	4	27
		6			3 223	10	39			3 439	10	39			3 655	10	39
		8			4 297	19	47			4 585	18	47			4 873	18	47
		10			5 371	30	53			5 731	29	53			6 091	28	53
	250	4	0.200	0.187	2 686	4	28	0.213	0.199	2 866	4	28	0.225	0.212	3 046	4	28
		6			4 028	10	40			4 298	10	40			4 568	10	40
		8			5 371	19	48			5 731	18	48			6 091	18	48
		10			6 714	29	54			7 164	29	54			7 614	28	54
	300	4	0.240	0.224	3 223	4	29	0.255	0.239	3 439	4	29	0.270	0.254	3 655	4	29
		6			4 834	10	40			5 158	10	41			5 482	10	41
		8			6 445	18	48			6 877	18	48			7 309	17	48
		10			8 057	29	54			8 597	28	54			9 137	27	54
	350	4	0.280	0.261	3 760	4	29	0.298	0.279	4 012	4	30	0.315	0.296	4 264	4	30
		6			5 640	10	41			6 018	10	41			6 396	9	40
		8			7 520	18	49			8 024	17	48			8 528	17	49
		10			9 400	28	55			10 030	28	55			10 660	27	55
	400	4	0.320	0.298	4 297	4	30	0.340	0.318	4 585	4	30	0.360	0.338	4 873	4	30
		6			6 445	10	42			6 877	9	41			7 309	9	41
		8			8 594	18	49			9 170	17	49			9 746	17	49
		10			10 742	28	55			11 462	27	55			12 182	26	55
	450	4	0.360	0.336	4 834	4	30	0.383	0.358	5 158	4	31	0.405	0.381	5 482	4	31
		6			7 251	9	41			7 737	9	41			8 223	9	41
		8			9 668	17	49			10 316	17	49			10 964	16	49
		10			12 085	27	55			12 895	26	55			13 705	26	55
	500	4	0.400	0.373	5 371	4	31	0.425	0.398	5 731	4	31	0.450	0.423	6 091	4	31
		6			8 057	9	41			8 597	9	42			9 137	9	42
		8			10 742	17	50			11 462	16	49			12 182	16	49
		10			13 428	26	55			14 328	26	55			15 228	25	55
	550	4	0.440	0.410	5 908	4	31	0.468	0.438	6 304	4	31	0.495	0.465	6 700	3	28
		6			8 862	9	42			9 456	9	42			10 050	8	41
		8			11 817	16	49			12 609	16	50			13 401	15	49
		10			14 771	26	56			15 761	25	55			16 751	24	55
	600	4	0.480	0.448	6 445	4	32	0.510	0.478	6 877	3	28	0.540	0.508	7 309	3	28
		6			9 668	9	42			10 316	8	41			10 964	8	41
		8			12 891	16	50			13 755	15	49			14 619	15	49
		10			16 114	25	55			17 194	24	55			18 274	24	55
	650	4	0.520	0.485	6 983	3	28	0.553	0.517	7 451	3	28	0.585	0.550	7 919	3	29
		6			10 474	8	41			11 176	8	41			11 878	8	41
		8			13 965	15	49			14 901	15	49			15 837	14	49
		10			17 456	24	55			18 626	24	56			19 796	23	55
700	4	0.560	0.522	7 520	3	28	0.595	0.557	8 024	3	29	0.630	0.592	8 528	3	29	
	6			11 280	8	41			12 036	8	42			12 792	8	42	
	8			15 039	15	49			16 047	14	49			17 055	14	49	
	10			18 799	24	56			20 059	23	55			21 319	22	55	

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d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		800					850					900					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	750	4			8 057	3	29			8 597	3	29			9 137	3	29
		6	0.600	0.560	12 085	8	42	0.638	0.597	12 895	8	42	0.675	0.635	13 705	7	40
		8			16 114	14	49			17 194	14	49			18 274	14	49
		10			20 142	23	55			21 492	22	55			22 842	21	55
	800	4			8 594	3	29			9 170	3	29			9 746	3	30
		6	0.640	0.597	12 891	8	42	0.680	0.637	13 755	7	40	0.720	0.677	14 619	7	41
		8			17 188	14	49			18 340	13	48			19 492	13	49
		10			21 485	22	55			22 925	21	55			24 365	21	55
	850	4			9 131	3	29			9 743	3	30			10 355	3	30
		6	0.680	0.634	13 697	7	40	0.723	0.677	14 615	7	41	0.765	0.719	15 533	7	41
		8			18 262	13	48			19 486	13	49			20 710	13	49
		10			22 828	21	55			24 358	21	55			25 888	20	55
900	4			9 668	3	30			10 316	3	30			10 964	3	30	
	6	0.720	0.671	14 502	7	41	0.765	0.716	15 474	7	41	0.810	0.761	16 446	7	41	
	8			19 336	13	49			20 632	13	49			21 928	12	48	
	10			24 170	21	55			25 790	20	55			27 410	19	54	
1000	4			10 742	3	30			11 462	3	30			12 182	2	25	
	6	0.800	0.746	16 114	7	41	0.850	0.796	17 194	6	39	0.900	0.846	18 274	6	40	
	8			21 485	12	48			22 925	12	48			24 365	11	48	
	10			26 856	19	54			28 656	18	54			30 456	18	54	
1100	4			11 817	2	25			12 609	2	25			13 401	2	26	
	6	0.880	0.821	17 725	6	39	0.935	0.876	18 913	6	40	0.990	0.931	20 101	6	40	
	8			23 633	11	47			25 217	11	48			26 801	10	47	
	10			29 542	18	54			31 522	17	53			33 502	16	53	
1200	4			12 891	2	26			13 755	2	26			14 619	2	26	
	6	0.960	0.895	19 336	6	40	1.020	0.955	20 632	5	38	1.080	1.015	21 928	5	38	
	8			25 782	10	47			27 510	10	47			29 238	9	46	
	10			32 227	16	53			34 387	16	53			36 547	15	52	
1300	4			13 965	2	26			14 901	2	26			15 837	2	26	
	6	1.040	0.970	20 948	5	38	1.105	1.035	22 352	5	38	1.170	1.100	23 756	5	38	
	8			27 930	9	45			29 802	9	46			31 674	9	46	
	10			34 913	15	52			37 253	14	52			39 593	14	52	
1400	4			15 039	2	26			16 047	2	27			17 055	2	27	
	6	1.120	1.044	22 559	5	38	1.190	1.114	24 071	4	36	1.260	1.184	25 583	4	36	
	8			30 079	9	46			32 095	8	45			34 111	8	45	
	10			37 598	14	52			40 118	13	51			42 638	13	51	
1500	4			16 114	2	27			17 194	1	18			18 274	1	18	
	6	1.200	1.119	24 170	4	36	1.275	1.194	25 790	4	36	1.350	1.269	27 410	4	36	
	8			32 227	8	45			34 387	7	43			36 547	7	43	
	10			40 284	12	50			42 984	12	50			45 684	11	49	

mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		1000					1100					1200					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4	0.200	0.189	2 724	4	28	0.220	0.209	3 012	4	28	0.240	0.229	3 300	4	29
		6			4 087	9	38			4 519	9	39			4 951	9	39
		8			5 449	17	47			6 025	16	46			6 601	16	47
		10			6 811	27	53			7 531	26	53			8 251	25	53
	250	4	0.250	0.237	3 406	4	29	0.275	0.262	3 766	4	29	0.300	0.287	4 126	4	30
		6			5 108	9	39			5 648	9	40			6 188	9	40
		8			6 811	17	48			7 531	16	47			8 251	16	48
		10			8 514	27	54			9 414	25	53			10 314	25	54
	300	4	0.300	0.284	4 087	4	30	0.330	0.314	4 519	4	30	0.360	0.344	4 951	3	27
		6			6 130	9	40			6 778	9	41			7 426	8	39
		8			8 173	17	48			9 037	16	48			9 901	15	48
		10			10 217	26	54			11 297	25	54			12 377	24	54
	350	4	0.350	0.331	4 768	4	30	0.385	0.366	5 272	3	27	0.420	0.401	5 776	3	27
		6			7 152	9	41			7 908	8	40			8 664	8	40
		8			9 536	16	48			10 544	15	48			11 552	15	48
		10			11 920	26	55			13 180	24	54			14 440	24	54
	400	4	0.400	0.378	5 449	4	31	0.440	0.418	6 025	3	28	0.480	0.458	6 601	3	28
		6			8 173	9	41			9 037	8	40			9 901	8	41
		8			10 898	16	49			12 050	15	48			13 202	14	48
		10			13 622	25	55			15 062	24	55			16 502	23	54
	450	4	0.450	0.426	6 130	3	28	0.495	0.471	6 778	3	28	0.540	0.516	7 426	3	28
		6			9 195	8	40			10 167	8	41			11 139	8	41
		8			12 260	15	49			13 556	15	49			14 852	14	49
		10			15 325	24	55			16 945	23	55			18 565	22	54
	500	4	0.500	0.473	6 811	3	28	0.550	0.523	7 531	3	28	0.600	0.573	8 251	3	29
		6			10 217	8	41			11 297	8	41			12 377	7	40
		8			13 622	15	49			15 062	14	49			16 502	14	49
		10			17 028	24	55			18 828	23	55			20 628	22	55
550	4	0.550	0.520	7 492	3	28	0.605	0.575	8 284	3	29	0.660	0.630	9 076	3	29	
	6			11 238	8	41			12 426	8	42			13 614	7	40	
	8			14 985	15	49			16 569	14	49			18 153	13	48	
	10			18 731	23	55			20 711	22	55			22 691	21	55	
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	30	
	6			12 260	8	42			13 556	7	40			14 852	7	41	
	8			16 347	14	49			18 075	13	48			19 803	13	49	
	10			20 434	22	55			22 594	21	55			24 754	20	54	
650	4	0.650	0.615	8 855	3	29	0.715	0.680	9 791	3	30	0.780	0.745	10 727	3	30	
	6			13 282	7	40			14 686	7	41			16 090	7	41	
	8			17 709	14	49			19 581	13	49			21 453	12	48	
	10			22 136	22	55			24 476	21	55			26 816	20	55	
700	4	0.700	0.662	9 536	3	30	0.770	0.732	10 544	3	30	0.840	0.802	11 552	3	30	
	6			14 304	7	41			15 816	7	41			17 328	7	41	
	8			19 071	13	49			21 087	13	49			23 103	12	48	
	10			23 839	21	55			26 359	20	55			28 879	19	54	

mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		1000					1100					1200					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	750	4			10 217	3	30			11 297	3	30			12 377	3	31
		6	0.750	0.710	15 325	7	41	0.825	0.785	16 945	7	41	0.900	0.860	18 565	6	40
		8			20 434	13	49			22 594	12	48			24 754	12	49
		10			25 542	20	55			28 242	19	54			30 942	18	54
	800	4			10 898	3	30			12 050	3	31			13 202	2	26
		6	0.800	0.757	16 347	7	41	0.880	0.837	18 075	6	40	0.960	0.917	19 803	6	40
		8			21 796	12	48			24 100	12	49			26 404	11	48
		10			27 245	20	55			30 125	19	55			33 005	18	54
	850	4			11 579	3	30			12 803	2	26			14 027	2	26
		6	0.850	0.804	17 369	6	39	0.935	0.889	19 205	6	40	1.020	0.974	21 041	6	40
		8			23 158	12	48			25 606	11	48			28 054	11	48
		10			28 948	19	54			32 008	18	54			35 068	17	54
900	4			12 260	2	25			13 556	2	26			14 852	2	26	
	6	0.900	0.851	18 390	6	40	0.990	0.941	20 334	6	40	1.080	1.031	22 278	6	40	
	8			24 520	11	48			27 112	11	48			29 704	10	47	
	10			30 650	18	54			33 890	17	54			37 130	16	53	
1000	4			13 622	2	26			15 062	2	26			16 502	2	27	
	6	1.000	0.946	20 434	6	40	1.100	1.046	22 594	5	38	1.200	1.146	24 754	5	39	
	8			27 245	11	48			30 125	10	47			33 005	9	46	
	10			34 056	17	54			37 656	16	53			41 256	15	53	
1100	4			14 985	2	26			16 569	2	27			18 153	2	27	
	6	1.100	1.041	22 477	5	38	1.210	1.151	24 853	5	39	1.320	1.261	27 229	5	39	
	8			29 969	10	47			33 137	9	46			36 305	9	47	
	10			37 462	15	52			41 422	14	52			45 382	14	52	
1200	4			16 347	2	27			18 075	2	27			19 803	2	27	
	6	1.200	1.135	24 520	5	39	1.320	1.255	27 112	4	36	1.440	1.375	29 704	4	36	
	8			32 694	9	46			36 150	8	45			39 606	8	45	
	10			40 867	14	52			45 187	13	51			49 507	13	52	
1300	4			17 709	2	27			19 581	2	27			21 453	1	19	
	6	1.300	1.230	26 564	4	36	1.430	1.360	29 372	4	36	1.560	1.490	32 180	4	37	
	8			35 418	8	45			39 162	8	45			42 906	7	44	
	10			44 273	13	51			48 953	12	51			53 633	11	50	
1400	4			19 071	1	18			21 087	1	19			23 103	1	19	
	6	1.400	1.324	28 607	4	36	1.540	1.464	31 631	4	37	1.680	1.604	34 655	3	33	
	8			38 143	7	44			42 175	7	44			46 207	6	42	
	10			47 678	12	51			52 718	11	50			57 758	10	49	
1500	4			20 434	1	19			22 594	1	19			24 754	1	19	
	6	1.500	1.419	30 650	4	37	1.650	1.569	33 890	3	33	1.800	1.719	37 130	3	34	
	8			40 867	7	44			45 187	6	42			49 507	6	43	
	10			51 084	11	50			56 484	10	49			61 884	9	48	

mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		1300					1400					1500					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4	0.260	0.249	3 588	3	25	0.280	0.269	3 876	3	26	0.300	0.289	4 164	3	26
		6			5 383	8	38			5 815	8	38			6 247	8	39
		8			7 177	15	46			7 753	15	47			8 329	14	46
		10			8 971	24	52			9 691	23	52			10 411	23	52
	250	4	0.325	0.312	4 486	3	26	0.350	0.337	4 846	3	27	0.375	0.362	4 164	3	27
		6			6 728	8	39			7 268	8	39			6 247	8	40
		8			8 971	15	47			9 691	14	47			8 329	14	47
		10			11 214	24	53			12 114	23	53			10 411	22	53
	300	4	0.390	0.374	5 383	3	27	0.420	0.404	5 815	3	27	0.450	0.434	6 247	3	28
		6			8 074	8	40			8 722	8	40			9 370	8	40
		8			10 765	15	48			11 629	14	47			12 493	14	48
		10			13 457	23	54			14 537	22	53			15 617	22	54
350	4	0.455	0.436	6 280	3	28	0.490	0.471	6 784	3	28	0.525	0.506	7 288	3	28	
	6			9 420	8	40			10 176	8	41			10 932	7	39	
	8			12 560	14	48			13 568	14	48			14 576	13	47	
	10			15 700	23	54			16 960	22	54			18 220	21	54	
400	4	0.520	0.498	7 177	3	28	0.560	0.538	7 753	3	29	0.600	0.578	8 329	3	29	
	6			10 765	8	41			11 629	7	40			12 493	7	40	
	8			14 354	14	48			15 506	13	48			16 658	13	48	
	10			17 942	22	54			19 382	21	54			20 822	21	54	
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	29	
	6			12 111	7	40			13 083	7	40			14 055	7	40	
	8			16 148	14	49			17 444	13	48			18 740	13	49	
	10			20 185	21	54			21 805	21	54			23 425	20	54	
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	41			15 617	7	41	
	8			17 942	13	48			19 382	13	49			20 822	12	48	
	10			22 428	21	55			24 228	20	54			26 028	19	54	
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	30	
	6			14 802	7	41			15 990	7	41			17 178	6	39	
	8			19 737	13	49			21 321	12	48			22 905	12	48	
	10			24 671	20	54			26 651	19	54			28 631	19	54	
600	4	0.780	0.748	10 765	3	30	0.840	0.808	11 629	3	30	0.900	0.868	12 493	2	25	
	6			16 148	7	41			17 444	6	39			18 740	6	40	
	8			21 531	12	48			23 259	12	48			24 987	11	48	
	10			26 914	20	55			29 074	19	54			31 234	18	54	
650	4	0.845	0.810	11 663	3	30	0.910	0.875	12 599	2	25	0.975	0.940	13 535	2	26	
	6			17 494	6	39			18 898	6	40			20 302	6	40	
	8			23 325	12	48			25 197	11	48			27 069	11	48	
	10			29 156	19	54			31 496	18	54			33 836	18	54	
700	4	0.910	0.872	12 560	2	25	0.980	0.942	13 568	2	26	1.050	1.012	14 576	2	26	
	6			18 840	6	40			20 352	6	40			21 864	6	40	
	8			25 119	11	48			27 135	11	48			29 151	11	48	
	10			31 399	18	54			33 919	17	54			36 439	17	54	

mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		1300					1400					1500					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	750	4	0.975	0.935	13 457	2	26	1.050	1.010	14 537	2	26	1.125	1.085	15 617	3	31
		6			20 185	6	40			21 805	6	40			23 425	6	40
		8			26 914	11	48			29 074	11	48			31 234	12	49
		10			33 642	18	54			36 342	17	54			39 042	18	54
	800	4	1.040	0.997	14 354	2	26	1.120	1.077	15 506	2	26	1.200	1.157	16 658	2	26
		6			21 531	6	40			23 259	6	41			24 987	6	40
		8			28 708	11	48			31 012	10	47			33 316	11	48
		10			35 885	17	54			38 765	16	53			41 645	18	54
	850	4	1.105	1.059	15 251	2	26	1.190	1.144	16 475	2	27	1.275	1.229	17 699	2	26
		6			22 877	6	41			24 713	5	39			26 549	6	40
		8			30 502	10	47			32 950	10	48			35 398	11	48
		10			38 128	16	53			41 188	16	54			44 248	17	54
900	4	1.170	1.121	16 148	2	27	1.260	1.211	17 444	2	27	1.350	1.301	18 740	2	26	
	6			24 222	5	38			26 166	5	39			28 110	6	40	
	8			32 296	10	47			34 888	9	46			37 480	10	47	
	10			40 370	16	54			43 610	15	53			46 850	16	53	
1000	4	1.300	1.246	17 942	2	27	1.400	1.346	19 382	2	27	1.500	1.446	20 822	2	27	
	6			26 914	5	39			29 074	5	39			31 234	5	39	
	8			35 885	9	47			38 765	9	47			41 645	9	46	
	10			44 856	14	52			48 456	14	53			52 056	15	53	
1100	4	1.430	1.371	19 737	2	27	1.540	1.481	21 321	2	28	1.650	1.591	22 905	2	27	
	6			29 605	4	36			31 981	4	37			34 357	5	39	
	8			39 473	8	45			42 641	8	46			45 809	9	47	
	10			49 342	13	52			53 302	12	51			57 262	14	52	
1200	4	1.560	1.495	21 531	1	19	1.680	1.615	23 259	1	19	1.800	1.735	24 987	2	27	
	6			32 296	4	37			34 888	4	37			37 480	4	36	
	8			32 694	9	46			36 150	8	45			39 606	8	45	
	10			40 867	14	52			45 187	13	51			49 507	13	52	

mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems

3.6.2 | mcr FID S/S p/O circular dampers technical parameters

D – nominal diameter [mm]

v – velocity [m/s]

Q – flow [m³/h]

S_k – duct cross-section [m²]

d_p – pressure drop [Pa]

S_e – damper active cross-section [m²]

L_{WA} – damper noise level [dB]

D [m/s]	v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
250	4	0.0491	0.0392	281	1	15
	6			560	4	24
	8			890	8	28
	10			1130	11	33
315	4	0.0779	0.0653	478	1	18
	6			949	4	24
	8			1400	8	30
	10			1880	16	35
355	4	0.0989	0.0847	610	1	17
	6			1 220	5	24
	8			1 830	11	34
	10			2 440	20	40
400	4	0.1256	0.1096	789	1	17
	6			1 578	5	25
	8			2 367	11	34
	10			3 156	10	41

D [m/s]	v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
450	4	0,1590	0,1410	1 015	1	16
	6			2 030	4	25
	8			3 045	10	35
	10			4 060	18	41
500	4	0,1963	0,1763	1 269	1	18
	6			2 538	4	24
	8			3 807	8	33
	10			5 076	15	40
560	4	0,2462	0,2238	1 611	1	16
	6			3 222	3	24
	8			4 834	7	33
	10			6 445	13	39
630	4	0,3116	0,2864	2 062	1	20
	6			4 124	2	22
	8			6 186	5	33
	10			8 247	9	40

3.7.1 | 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	35	36	38	39	44	52	57	59	78	79	80	81	92		
	1400	37	39	41	44	48	56	63	65	80	82	85	87			
1500	40	41	44	48	52	58	68	71	82	98	115	120				

3.7.2 | Estimated weights of mcr FID S/S p/O dampers for circular ventilation ducts [kg]

diameter D [mm]	RST, KW1	actuator
250	7	8
315	9	10
355	12	13
400	14	15
450	15	16
500	16	17
560	18	19
630	20	21

3.8 | Accessories

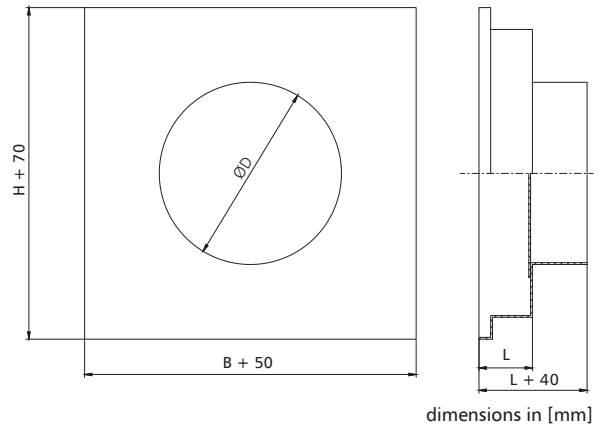
3.8.1 | mcr KRP connection stub

mcr KRP connection stubs are used to connect a circular ventilation duct to a rectangular damper. The connection is a „bare end“ pipe. The diameter of the stub pipe is 2 mm smaller than the diameter of the ventilation duct.

NOTE: due to the asymmetrical position of the fire blade in the damper casing, the connection stubs are of different lengths L, depending on the side of the damper on which they are to be used. Stubs are supplied for both sides of the damper.

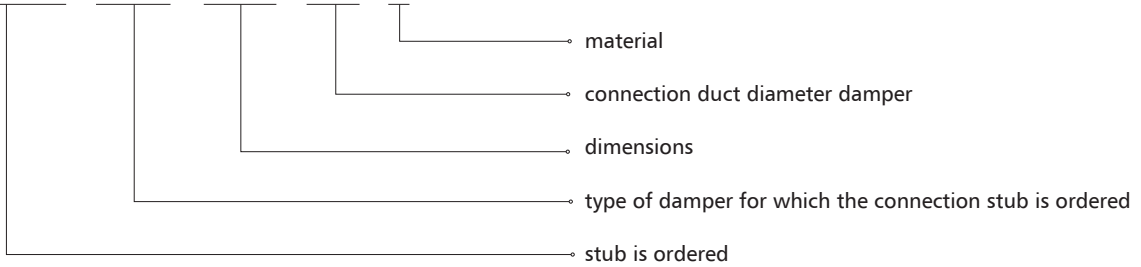
Dimensions:

- » BxH - damper dimensions [mm]
- » ØD - diameter of the connection duct [mm]
- » L - length [mm] calculated from the formula: H/2-50 for one connection side and H/2-150 for the other connection side



Marking:

mcr KRP / FID S / B x H / DIA / X

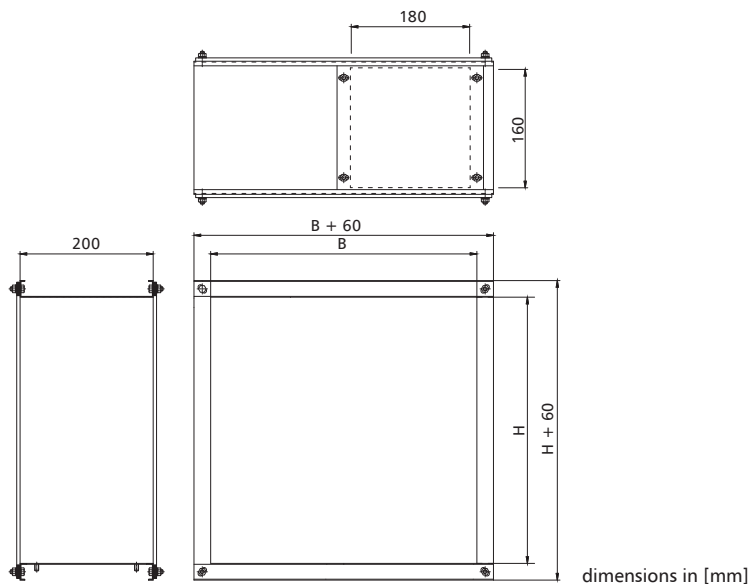


- X – material
- [no symbol] – galvanized steel, Zn 275 g/m2 coating²
- KN – stainless steel
- KK – 1.4404 acid-proof steel

3.8.2 | Casing module with KRW-type inspection access

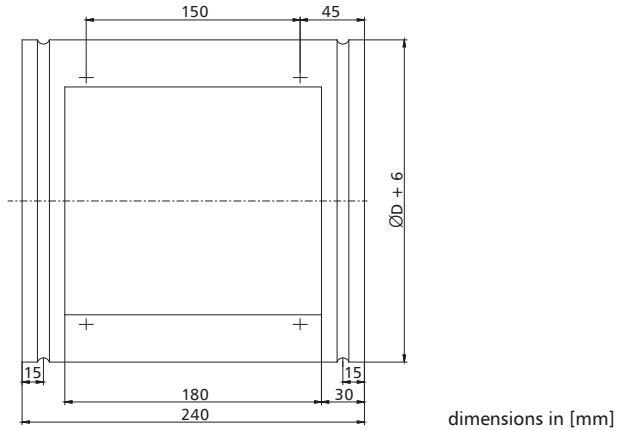
The casing modules with a KRW-type inspection access are made of sheet metal and equipped with connection flanges. The casing features an inspection access opening with a cover. The module enables to access the damper blade or a drive train quickly without having to dismantle the damper or the duct on which it is installed.

» KRW P module for rectangular damper



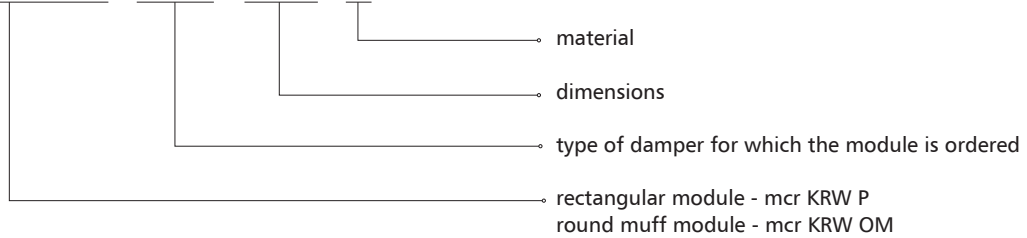
mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems

- » KRW OM module
- » round muff module for nipple damper



Marking:

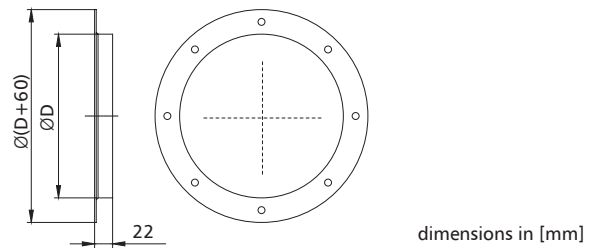
mcr KRW OM / FID S / B x H / X



- X – material
- [no symbol] – galvanized steel, Zn 275 g/m² coating²
- KN – stainless steel
- KK – 1.4404 acid-proof steel

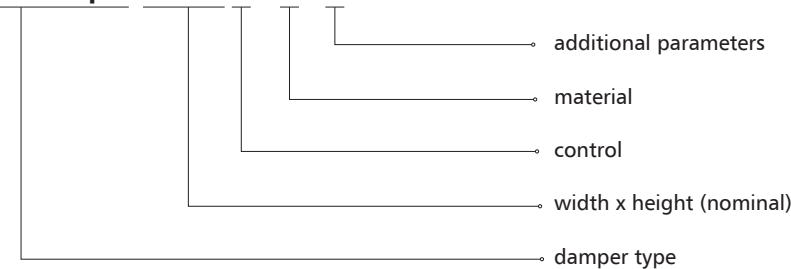
3.8.3 | KP type connection flange

The KP type connection flange is used to connect a round fire damper to a duct with a connection made in accordance with PN-EN 12220.



3.9 | Marking

mcr FID S/S p/P B x H 1 / 2 / 3



1 - control:

» RST trigger control mechanism

RST – thermal trigger

RST/WK1 – thermal trigger + “pulse” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)

RST/WK2 – thermal trigger + “break” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade)

» RST-KW1 trigger control mechanism

KW1/S – thermal trigger

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

KW1/24I/WK2 – thermal trigger + “pulse” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)

KW1/24P/WK2 – thermal trigger + “break” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade) signal)

KW1/24I/WK2(+MP230/24) – thermal trigger + “pulse” electromagnetic trigger, U = 230 V AC

+ limit switch (open/closed blade signal)

KW1/24P/WK2(+MP230/24) – thermal trigger + “break” electromagnetic trigger, U = 230 V AC

+ limit switch (open/closed blade signal)

» trigger and control mechanism, axial actuator

BF 24-T/BF 24-SR-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

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

BFL230-T/MLF230T – 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

BFN 24-T/BFN 24-SR-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

MLF24T – actuator with a return spring, U = 24 V AC/DC

MLF230T – actuator with a return spring, U = 230 V AC

MF24T – actuator with a return spring, U = 24 V AC/DC

MF230T – actuator with a return spring, U = 230 V AC

2 - material

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

KN – stainless steel

KK – 1.4404 acid-proof steel

3 - additional parameters

» Thermoelectric and thermal triggers

[no symbol] – 72°C trigger

ZBAT95 – thermoelectric trigger for 95°C

T93-95 – thermal trigger for 95°C

T2-95 (MLF/MF) – thermoelectric trigger for 95°C

» Control mechanism position

[no symbol] – perpendicular to the damper rotation axis*

WOK – along the damper rotation axis

» Damper axis of rotation

[no symbol] – horizontal axis of rotation

PP_D – vertical axis of rotation – mechanism at the bottom of the damper

P_G – vertical axis of rotation - mechanism at the top of the damper

» Design standard

[no symbol] – right damper

KL – left damper (excl. round dampers)

KO – inverted damper (excl. round dampers)

» Extended damper casing

[no symbol] – standard casing length

400 – casing with a length of 400 mm

» Connection flange (round dampers only)

[no symbol] – damper without a flange – for the “bare end” connection

KP – damper with a connection flange

» Mounting runners (round dampers only)

WM – mounting runners (set)

Perimeter gaskets (round dampers only)

UKW – external perimeter gaskets

* for a round damper with a RST, RST-KW1 mechanism and a BF actuator, the trigger control mechanism is installed along the axis of rotation as standard – exception

NOTE: separate additional parameters entered with the “/” sign

mcr FID S/S p/P, mcr FID S/S p/O | Single-blade cut-off fire dampers for comfort ventilation systems

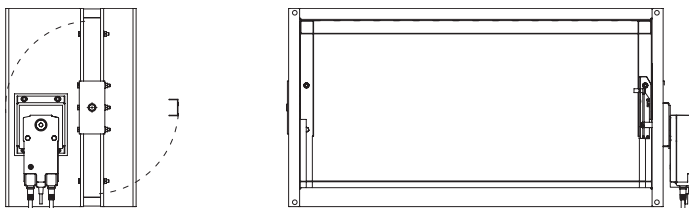
example marking:

mcr FID S/S p/P 400 x 400 BFL24-T
EI120 cut-off fire damper with a 24 V actuator with limit switches.

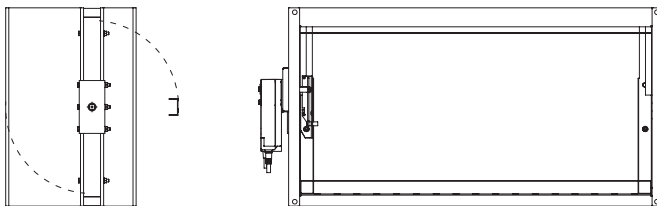
mcr FID S/S p/O Ø400 RST / WK2
EI120 cut-off fire damper with a 72°C thermal trigger and damper blade opening and closing limit switch.

3.9.1 | Design standard

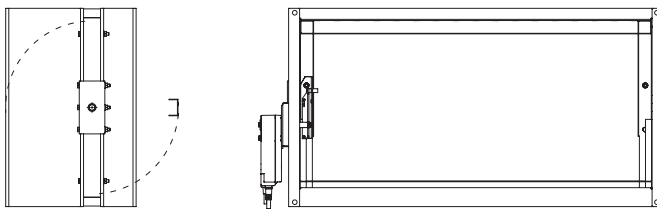
» right damper - standard



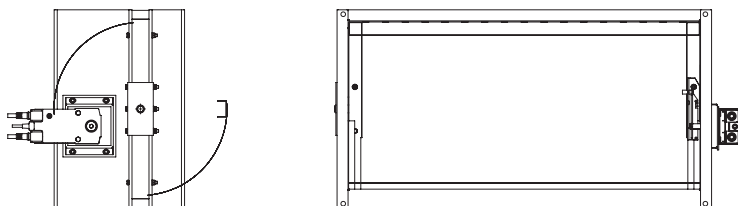
» inverted damper - (ducts facing downwards)



» left damper



» along the damper axis

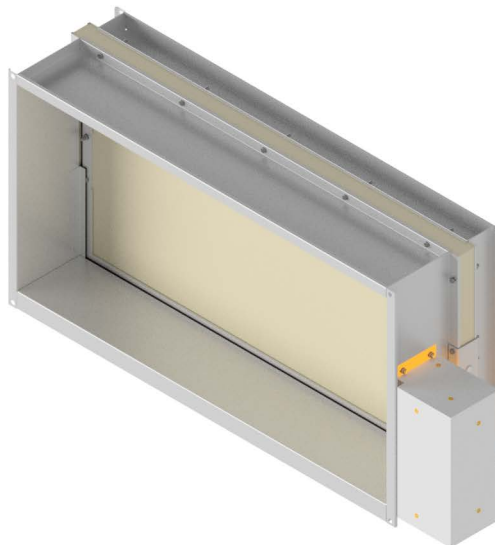


Chapter 16 - power supply and control (p. 262) contains the following information:
- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper.

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems



downloadable models
on the website
under the designer zone tab



ATEST HIGIENICZNY



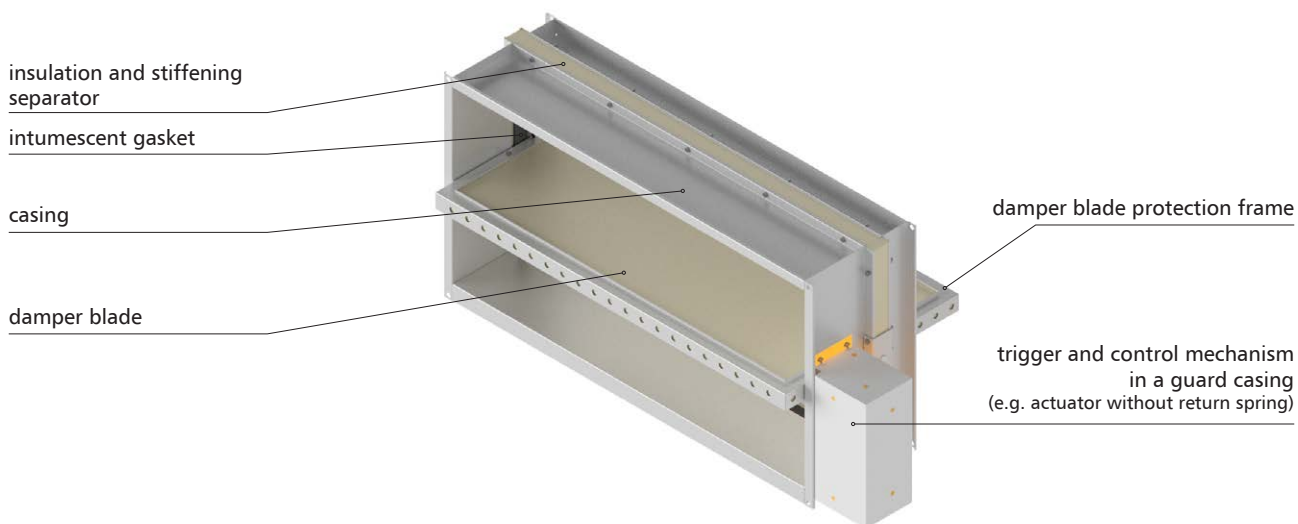
» EIS120, E₆₀₀ 120

- » Fire resistance class: EI120 (v_{ew} i↔o)S1000C₃₀₀AAmulti, EI120 (v_{ew} i↔o)S1500C₁₀₀₀AAmulti.
- » Certificate of constancy of performance 1488-CPR-0448/W, 2434-CPR-0029.
- » Dampers certified for compliance with EN 12101-8.
- » Dampers rated under EN 13501-4 and tested under EN 1366-10.
- » Cut-off dampers resistance independent of airflow direction and installation side.
- » Dampers certified for modular installation (batteries).
- » Certified installation on smoke ventilation ducts.
- » Certified AA (Automatic Activation) feature.

4.1 | Application

mcr FID S/V p/P, mcr FID S/V-M p/P smoke control dampers are intended for installation in automatically operated fire ventilation systems. mcr FID S/V p/P dampers are used in fire ventilation systems and the dampers marked mcr FID S/V-M p/P are used in mixed, fire and comfort ventilation systems. When installed, these devices prevent the propagation of fire, smoke and fire gases to adjacent areas. During normal operation, the fire damper blade is in the open or closed position, depending on its function. The fire damper blade in the fire compartment is opened, whereas in other areas the blades remain closed. Admissible flow velocity in the connected duct is 12 m/s.

4.2 | Design



mcr FID S/V p/P, mcr FID S/V-M p/P smoke control dampers consist of a casing with a rectangular cross-section, made of two segments separated with a fire-proof panel with a cross-section of 20 x 40 mm, a moving damper blade and a remotely activated actuator. Standard damper casing is made of galvanized steel sheets. A special casing is used for chemically aggressive environments, which features steel elements 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 a 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 metal sheet reinforcement profile. The inner side of the fire damper casing is equipped with an intumescent gasket. Stop profiles are attached to the inner casing surface, limiting the rotating motion of the damper blade. Stop profiles are lined with a polyethylene ventilation gasket.

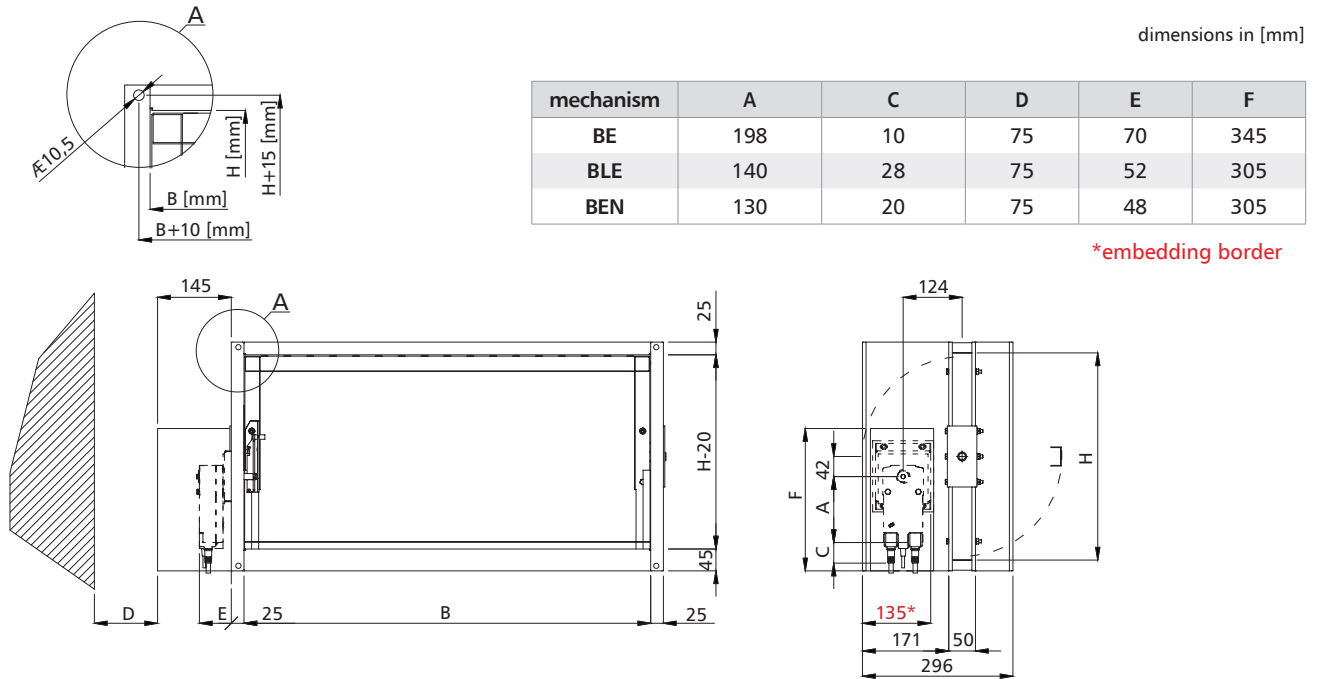
mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

4.3 | Versions

4.3.1 | Damper closing and opening with an actuator

During normal operation, the damper blade of the fire damper remains open or closed. In the case of fire, the damper blade in the compartment where the fire occurs opens and the damper blades in the remaining compartments are closed – the blades are operated remotely by supplying power.

The mcr FID S/V p/P, mcr FID S/V-M p/P dampers are equipped with a trigger and control mechanism in the form of BE, BEE or BEN series axial actuator, supplied with 24 V AC/DC or 230 V AC. Actuators are equipped with limit switches used to monitor the position of the damper blade. Dampers with BE, BEE or BEN actuators can be opened/closed by supplying voltage to the actuator terminals.



4.4 | Dimensions

damper installation in a construction partition:

- » nominal width B: from 200 mm to 1500 mm
- » nominal height H from 200 mm to 1500 mm
- » maximum single damper cross-section surface up to
 - 1.5 m² for FID S/V p/P dampers
 - 1.25 m² for FID S/V-M p/P dampers

damper installation on a fireproof duct:

- » nominal width B: from 200 mm to 1500 mm
- » nominal height H from 200 mm to 1000 mm
- » maximum single damper cross-section surface up to 1.5 m²

installation of dampers in a battery (set)

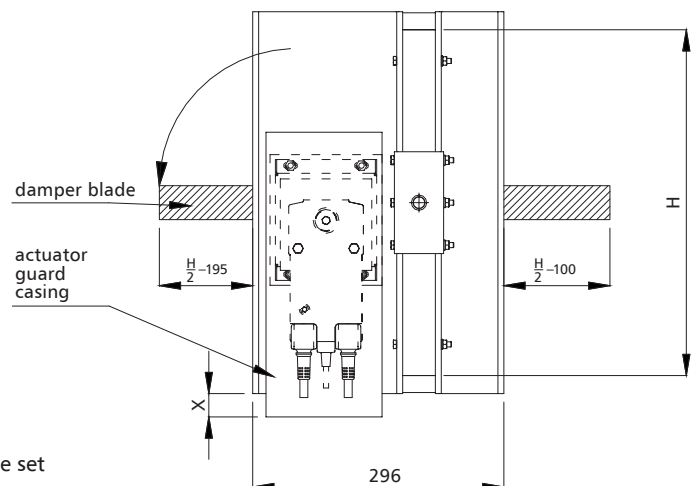
made up of 2 or 3 dampers:

- » dimensions 200 x 200 to 1500 x 710 mm
- » vertical rotation axis, mechanism on the top or bottom of the set

modular installation – one damper next to another

(only vertical rotation axes):

- » maximum width: n x 710 mm
- » maximum height: 2 x 1500 mm



Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges). For dampers with a $H < 500$ mm side, the actuator guard casing protrudes outside the damper body by the value X, calculated from the following formula $X = 250 - \frac{H}{2}$

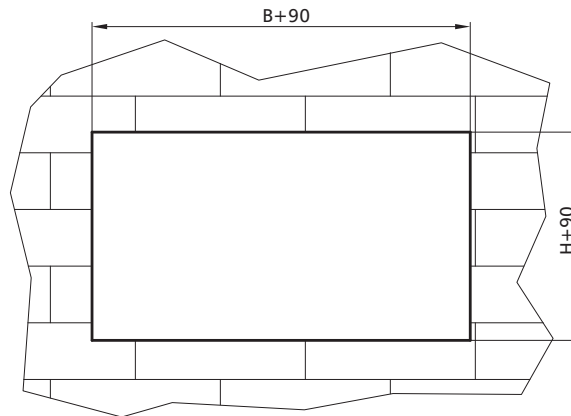
mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

4.5 | Installation

- » mcr FID S/V p/P rectangular dampers are rated EI120(v_{ew} i↔o)S1000C₃₀₀AAmulti if installed in wall/shaft partitions made of concrete, bricks, hollow bricks, masonry or prefabricated slabs with a min. thickness of 110 mm.
- » mcr FID S/V p/P rectangular dampers are rated EI120(v_{ew} i↔o)S1500C₁₀₀₀₀AAmulti if installed in wall/shaft partitions made of concrete, bricks, hollow bricks, masonry or prefabricated slabs with a min. thickness of 120 mm, in light walls made of gypsum boards on a steel framework with a min. thickness of 125 mm and a resistance rating no lesser than EI120.
- » mcr FID S/V-M p/P rectangular dampers are rated EI120(v_{ew} i↔o)S1500C₁₀₀₀₀AAmulti if installed in wall/shaft partitions made of concrete, bricks, hollow bricks, masonry or prefabricated slabs with a min. thickness of 125 mm, in light walls made of gypsum boards on a steel framework with a min. thickness of 125 mm and a resistance rating no lesser than EI120.
- » mcr FID S/V p/P rectangular dampers are rated EI120(v_{ed} h_{od} i↔o)S1000C₁₀₀₀₀AAmulti if installed in a fireproof duct compliant with EN 1366-8 or EN 1366-9, with fire resistance ratings equal to or lesser than the fire resistance rating of the damper.
- » A rectangular damper battery (set) is rated EI120(v_{ew} i↔o)S1000C₃₀₀AAmulti and EI60(v_{ew} i↔o)S1500C₁₀₀₀₀AAmulti if installed in partitions made of concrete, bricks, hollow bricks, masonry or prefabricated slabs with a min. thickness of 120 mm. Damper batteries can be combined together into modules.
- » mcr FID S/V p/P rectangular dampers are rated E₆₀ 120 (v_{ed} i↔o) S1000 C₁₀₀₀₀ AA single in single-zone fire ventilation systems.

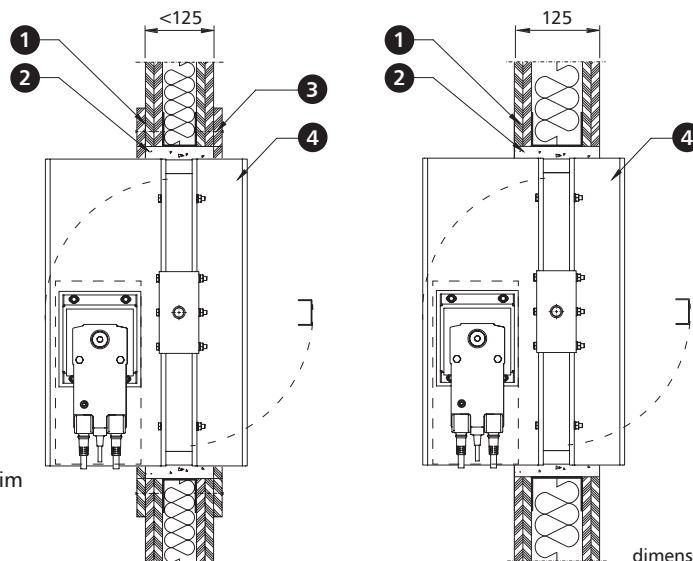
4.5.1 | Preparation of installation openings

- » preferred opening



dimensions in [mm]

4.5.2 | Sample installation in gypsum board light walls



1. light wall
2. sealing - gypsum mortar*
3. circumferential gypsum board trim
4. mcr FID S/V p/P smoke damper

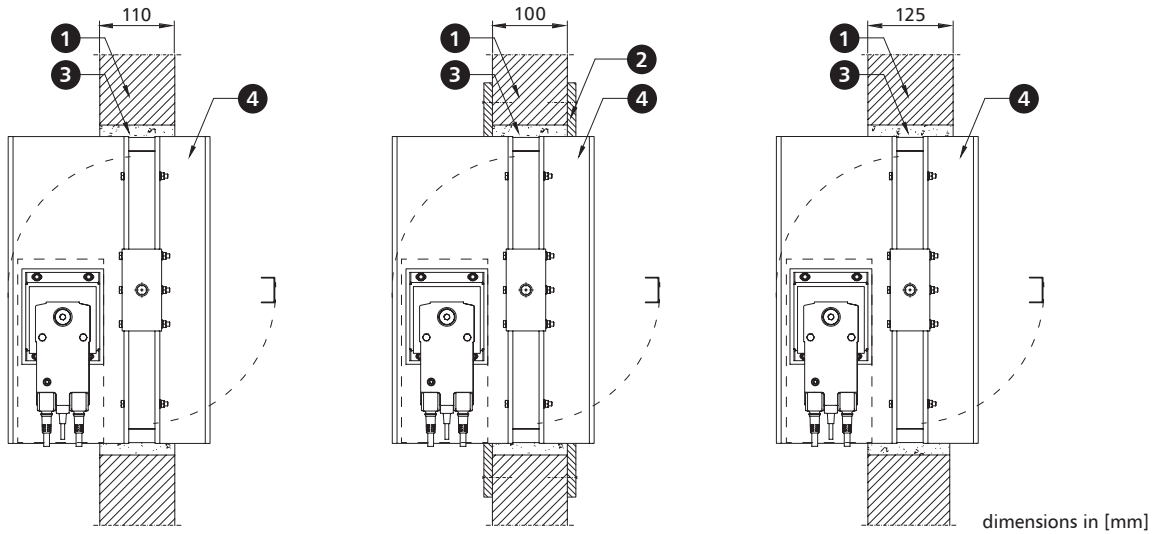
dimensions in [mm]

* The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 125 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.

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

4.5.3 | Sample installation in concrete and brick walls



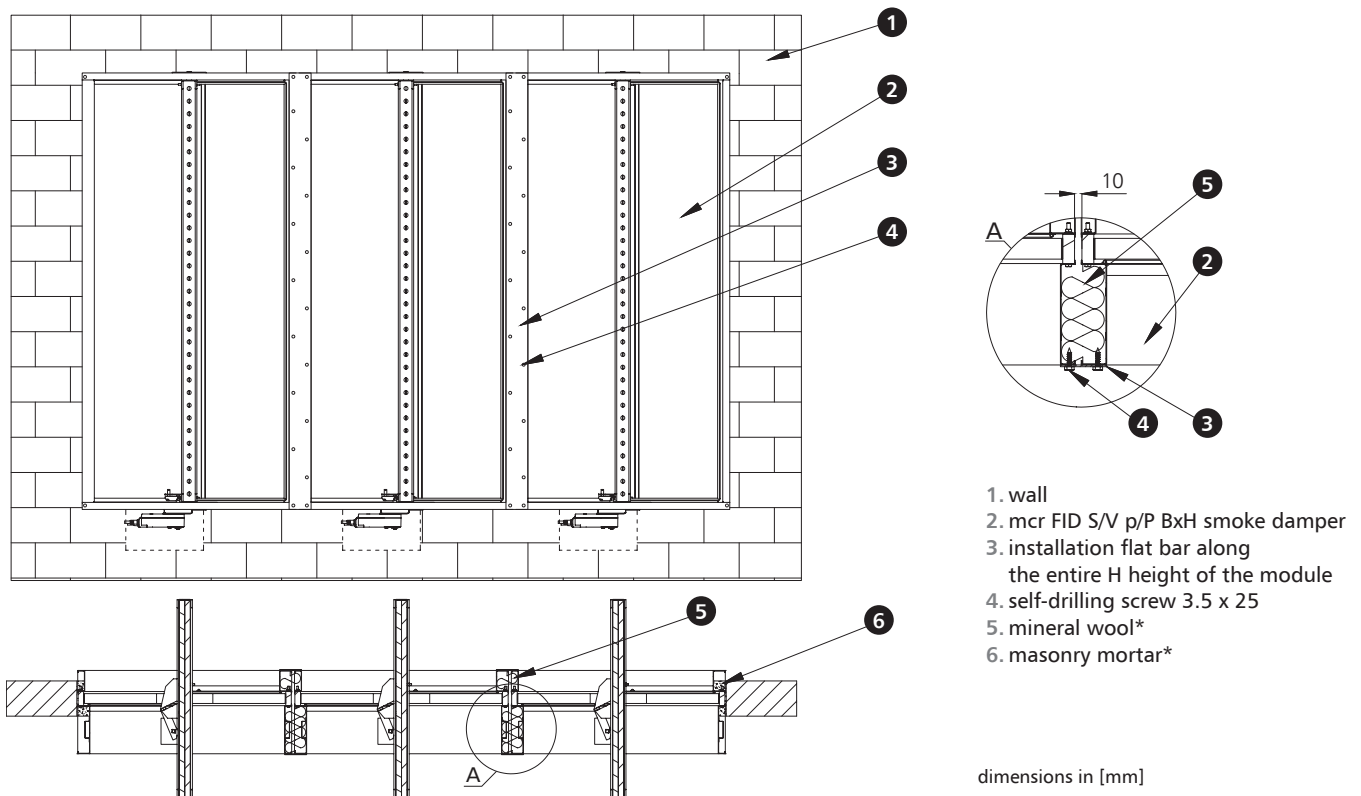
1. rigid wall - concrete, aerated concrete or bricks
2. circumferential gypsum board trim

3. sealing - concrete, cement or cement-lime masonry mortar*
4. mcr FID S/V p/P smoke damper

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the method applied

NOTE: If the damper is installed in a wall with a thickness of less than 110 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.

4.5.4 | Sample battery installation



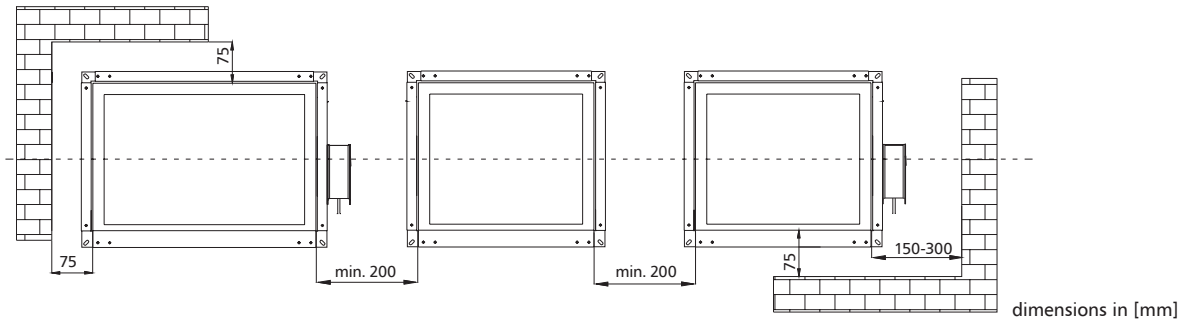
1. wall
2. mcr FID S/V p/P BxH smoke damper
3. installation flat bar along the entire H height of the module
4. self-drilling screw 3.5 x 25
5. mineral wool*
6. masonry mortar*

dimensions in [mm]

* Recommended filling of spaces between the dampers is based on wool with a min. density of 100 kg/m³ and fire resistance class A1. Recommended damper installation to the wall is based on masonry mortar on the basis of gypsum or cement.

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

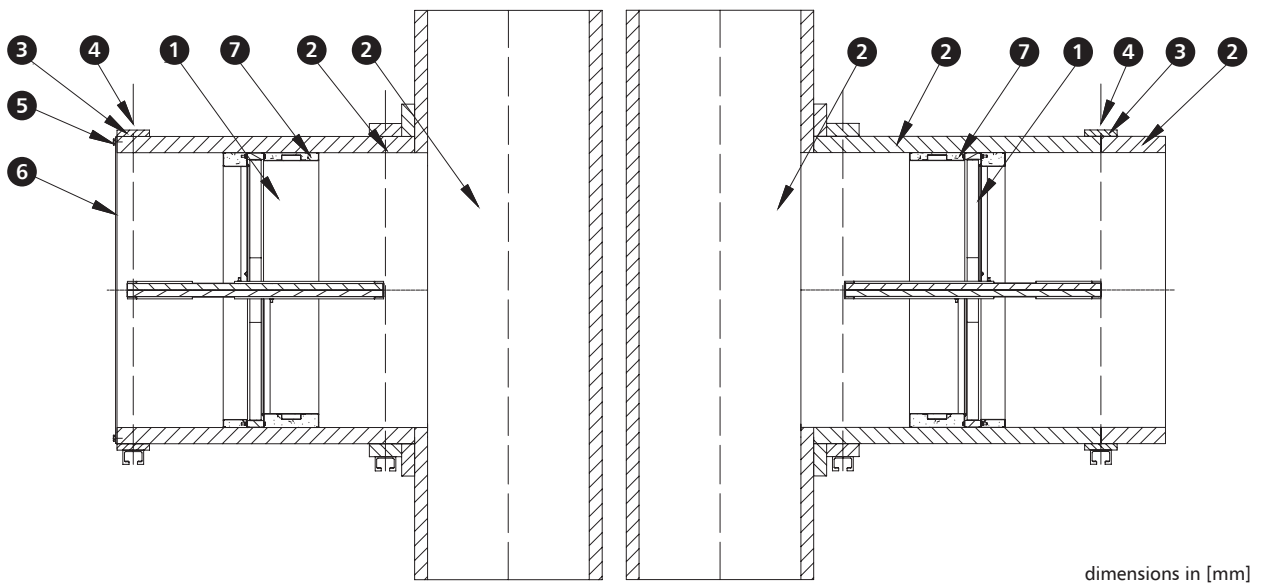
Distance between the individual systems and partitions



Damper installation with a vertical axis of rotation

Such installation must be clearly stated in the draft documentation and reported to the damper's manufacturer in the order. BxH damper dimensions should be provided in a manner similar to the damper with a horizontal rotation axis (actuator installed on the dimension provided as the second one, e.g. 1000 x 200(s) or 200 x 1000(s) PP).

4.5.5 | Damper installation on horizontal ducts



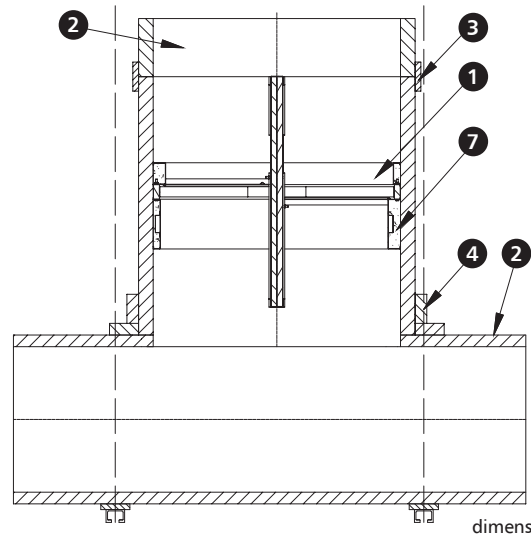
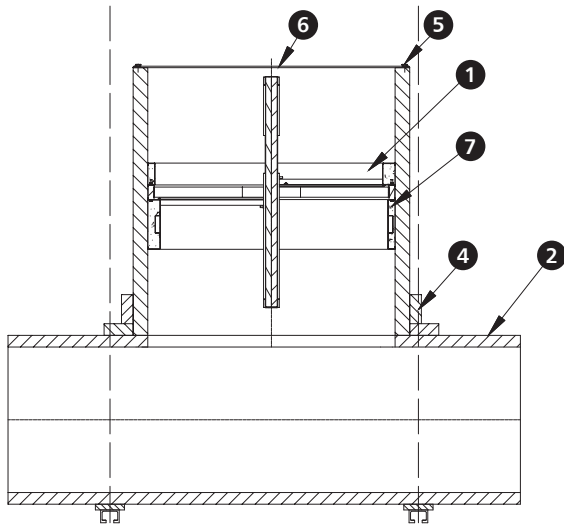
- 1. mcr FID S/V p/P BxH smoke damper
- 2. multi-zone smoke extract duct – e.g. made of fire-proof boards
- 3. a strip of fire-proof board along the entire length of the BxH side
- 4. installation hangers system

- 5. M10 x 20 bolt
- 6. MWB system grille (optional)
- 7. sealing

Smoke extraction ducts should be made in accordance with the ducts manufacturer's guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. The shut-off damper in vertical fire ventilation systems may be installed across the horizontal smoke extract duct or on the sides of the horizontal smoke extract duct or on the surface of any side of the vertical smoke extract duct. A masking grille may terminate the system.

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

4.5.6 | Damper installation on vertical ducts



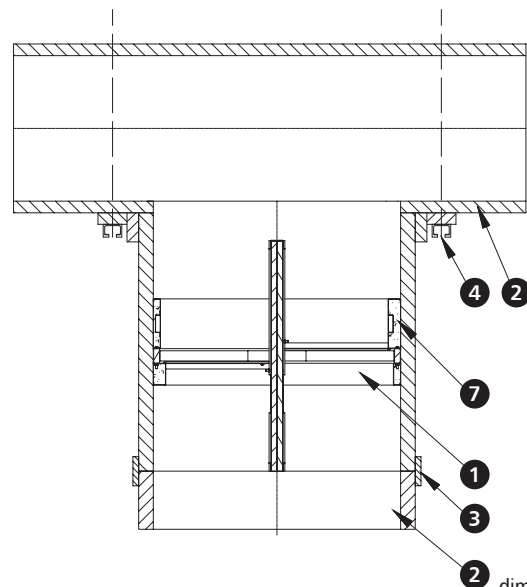
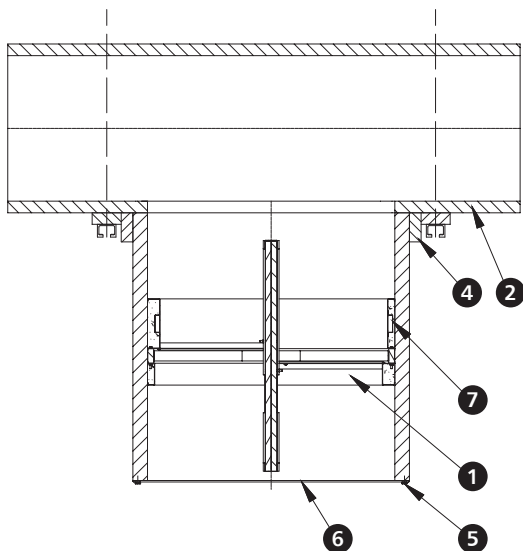
dimensions in [mm]

1. mcr FID S/V p/P BxH smoke damper
2. multi-zone smoke extract duct – e.g. made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. installation hangers system

5. M10 x 20 bolt
6. MWB system grille (optional)
7. sealing

Smoke extraction ducts should be made in accordance with the ducts manufacturer's guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. The shut-off damper in vertical fire ventilation systems may be installed across the horizontal smoke extract duct or on the sides of the horizontal smoke extract duct or on the surface of any side of the vertical smoke extract duct. A masking grille may terminate the system.

4.5.7 | Damper installation on vertical ducts



dimensions in [mm]

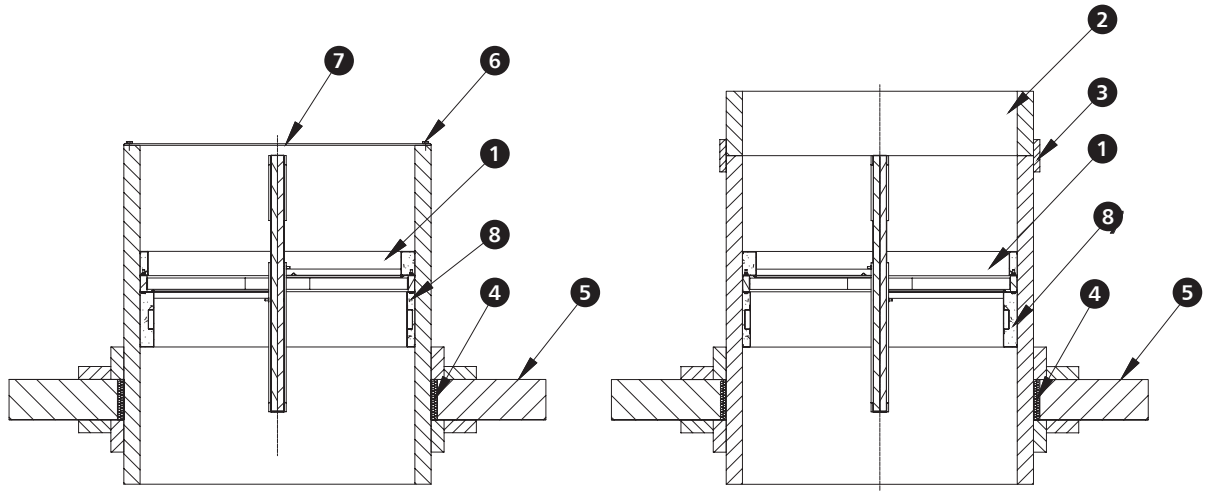
1. mcr FID S/V p/P BxH smoke damper
2. multi-zone smoke extract duct – e.g. made of fire-proof boards
3. a strip of fire-proof board along the entire length of the BxH side
4. installation hangers system

5. M10 x 20 bolt
6. MWB system grille (optional)
7. sealing

Smoke extraction ducts should be made in accordance with the ducts manufacturer's guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. The shut-off damper in vertical fire ventilation systems may be installed across the horizontal smoke extract duct or on the sides of the horizontal smoke extract duct or on the surface of any side of the vertical smoke extract duct. A masking grille may terminate the system.

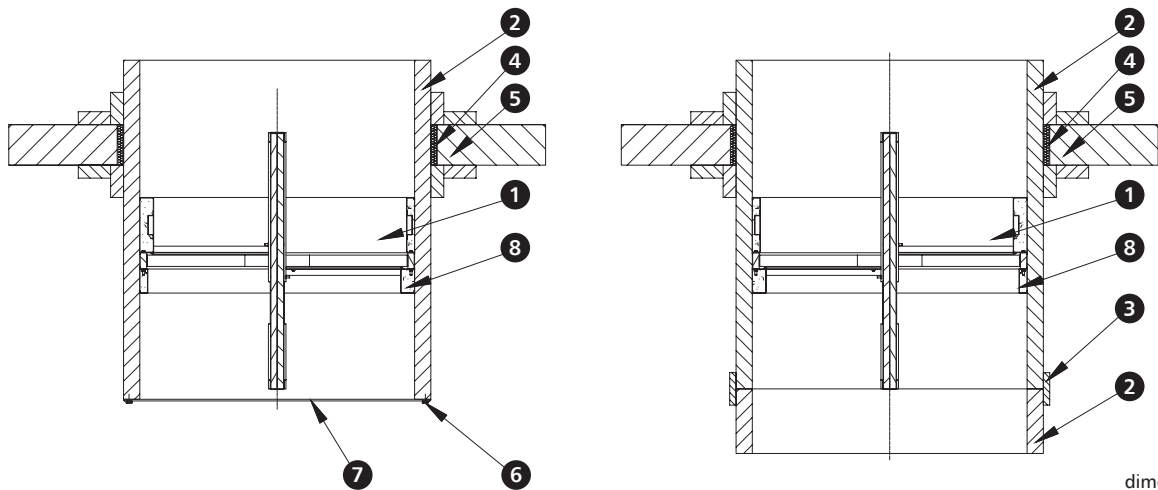
mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

4.5.8 | Damper installation on vertical ducts



- 1. mcr FID S/V p/P BxH smoke damper
- 2. multi-zone smoke extract duct – e.g. made of fire-proof boards
- 3. a strip of fire-proof board along the entire length of the BxH side
- 4. Fireproof duct installation penetration system

- 5. Floor slab
- 6. M10 x 20 bolt
- 7. MWB system grille (optional)
- 8. sealing



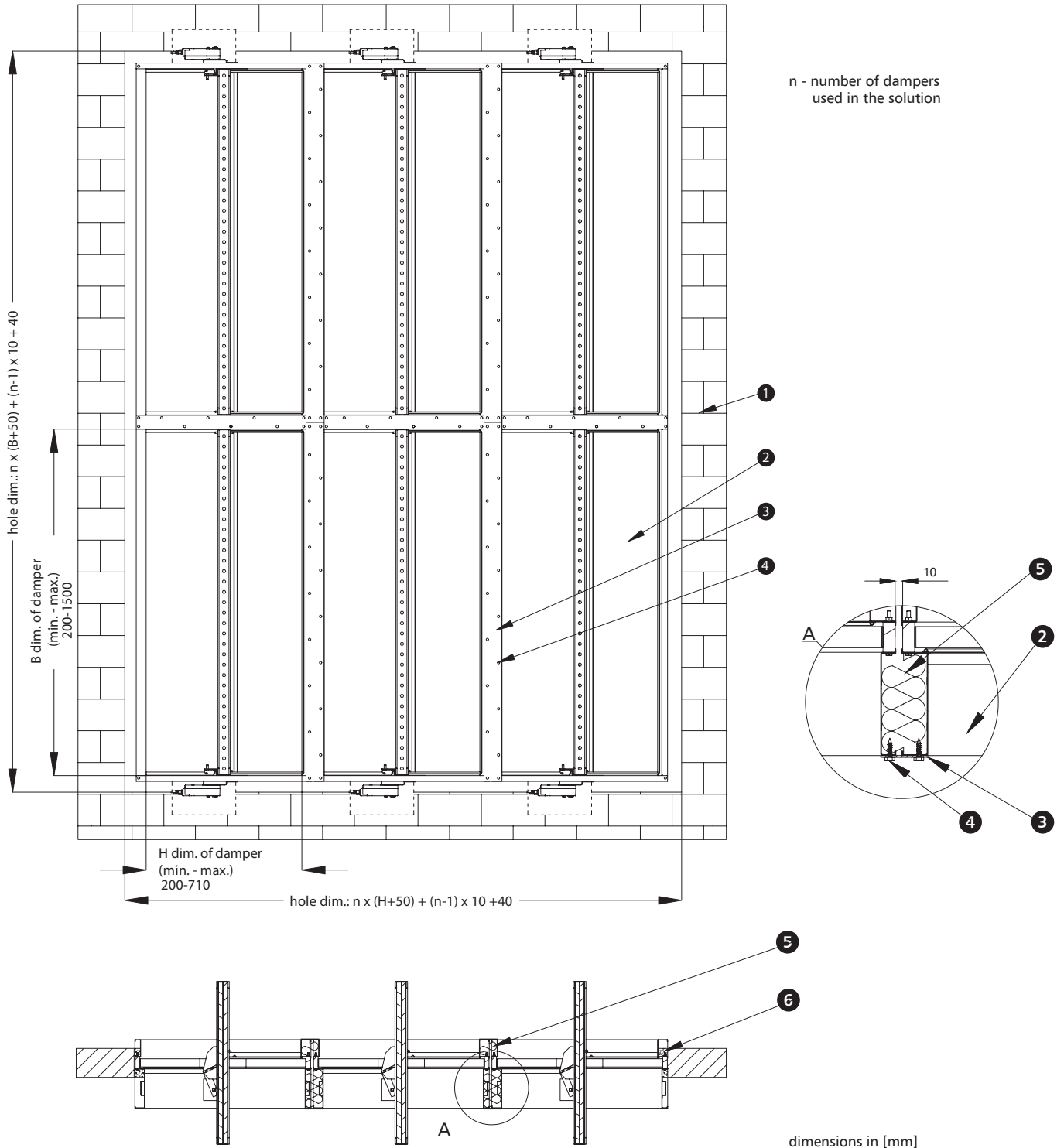
- 1. mcr FID S/V p/P BxH smoke damper
- 2. multi-zone smoke extract duct – e.g. made of fire-proof boards
- 3. a strip of fire-proof board along the entire length of the BxH side
- 4. Fireproof duct installation penetration system

- 5. Floor slab
- 6. M10 x 20 bolt
- 7. MWB system grille (optional)
- 8. sealing

dimensions in [mm]

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

4.5.9 | Sample damper battery (module) installation



- 1. wall
- 2. mcr FID S/V p/P BxH smoke damper
- 3. installation flat bar along the entire H height of the module

- 4. self-drilling screw 3.5 x 25
- 5. mineral wool*
- 6. masonry mortar*

* Recommended filling of spaces between the dampers is based on wool with a min. density of 100 kg/m³ and fire resistance class A1. Recommended damper installation to the wall is based on masonry mortar on the basis of gypsum or cement.

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

4.6 | mcr FID S/V p/P, mcr FID S/V-M p/P rectangular dampers technical parameters

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		200					250					300					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4	0.040	0.029	420	8	29	0.050	0.039	564	7	28	0.06	0.049	708	7	29
		6			631	19	40			847	17	40			1 063	16	40
		8			841	34	48			1 129	31	48			1 417	29	48
		10			1 051	54	54			1 411	49	54			1 771	45	54
	250	4	0.050	0.037	526	8	30	0.063	0.049	706	7	29	0.075	0.062	886	7	30
		6			788	19	41			1 058	17	41			1 328	16	41
		8			1 051	34	49			1 411	31	49			1 771	29	49
		10			1 314	54	55			1 764	49	55			2 214	45	54
	300	4	0.060	0.044	631	8	31	0.075	0.059	847	7	30	0.09	0.074	1 063	7	31
		6			946	19	42			1 270	17	42			1 594	16	42
		8			1 261	34	49			1 693	31	49			2 125	28	49
		10			1 577	54	55			2 117	48	55			2 657	45	55
	350	4	0.070	0.051	736	8	31	0.088	0.069	988	7	31	0.105	0.086	1 240	7	32
		6			1 104	19	42			1 482	17	42			1 860	16	42
		8			1 472	34	50			1 976	31	50			2 480	28	50
		10			1 840	53	56			2 470	48	56			3 100	44	56
	400	4	0.080	0.058	841	8	32	0.100	0.078	1 129	7	31	0.12	0.098	1 417	7	32
		6			1 261	19	43			1 693	17	43			2 125	15	42
		8			1 682	34	51			2 258	30	50			2 834	28	50
		10			2 102	53	56			2 822	48	56			3 542	44	56
	450	4	0.090	0.066	946	8	32	0.113	0.088	1 270	7	32	0.135	0.111	1 594	7	33
		6			1 419	19	44			1 905	17	43			2 391	15	43
		8			1 892	33	51			2 540	30	51			3 188	28	51
		10			2 365	53	57			3 175	47	57			3 985	43	56
	500	4	0.100	0.073	1 051	8	33	0.125	0.098	1 411	7	32	0.15	0.123	1 771	6	31
		6			1 577	18	43			2 117	16	43			2 657	15	43
		8			2 102	33	51			2 822	30	51			3 542	27	51
		10			2 628	52	57			3 528	47	57			4 428	43	57
550	4	0.110	0.080	1 156	8	33	0.138	0.108	1 552	7	33	0.165	0.135	1 948	6	32	
	6			1 734	18	44			2 328	16	43			2 922	15	44	
	8			2 313	33	52			3 105	29	51			3 897	27	51	
	10			2 891	51	57			3 881	46	57			4 871	42	57	
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	32	
	6			1 892	18	44			2 540	16	44			3 188	15	44	
	8			2 523	32	52			3 387	29	52			4 251	26	51	
	10			3 154	51	58			4 234	45	57			5 314	41	57	
650	4	0.130	0.095	1 367	8	34	0.163	0.127	1 835	7	33	0.195	0.160	2 303	6	32	
	6			2 050	18	44			2 752	16	44			3 454	14	43	
	8			2 733	32	52			3 669	28	51			4 605	26	51	
	10			3 416	50	58			4 586	44	57			5 756	40	57	
700	4	0.140	0.102	1 472	7	32	0.175	0.137	1 976	7	34	0.21	0.172	2 480	6	33	
	6			2 208	17	44			2 964	15	44			3 720	14	44	
	8			2 943	31	52			3 951	28	52			4 959	25	51	
	10			3 679	49	58			4 939	44	58			6 199	40	57	

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		200					250					300					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	750	4	0.150	0.110	1 577	7	33	0.188	0.147	2 117	6	32	0.225	0.185	2 657	6	33
		6			2 365	17	44			3 175	15	44			3 985	14	44
		8			3 154	31	52			4 234	27	52			5 314	25	52
		10			3 942	48	58			5 292	43	58			6 642	39	57
	800	4	0.160	0.117	1 682	7	33	0.200	0.157	2 258	6	32	0.24	0.197	2 834	6	33
		6			2 523	17	45			3 387	15	44			4 251	13	43
		8			3 364	30	52			4 516	27	52			5 668	24	51
		10			4 205	47	58			5 645	42	58			7 085	38	57
	850	4	0.170	0.124	1 787	7	33	0.213	0.167	2 399	6	33	0.255	0.209	3 011	5	31
		6			2 681	16	44			3 599	14	44			4 517	13	44
		8			3 574	29	52			4 798	26	52			6 022	23	51
		10			4 468	46	58			5 998	41	58			7 528	37	57
900	4	0.180	0.131	1 892	7	34	0.225	0.176	2 540	6	33	0.27	0.221	3 188	5	31	
	6			2 838	16	44			3 810	14	44			4 782	13	44	
	8			3 784	29	52			5 080	25	51			6 376	23	51	
	10			4 730	45	58			6 350	40	58			7 970	36	57	
1000	4	0.200	0.146	2 102	7	34	0.250	0.196	2 822	6	33	0.3	0.246	3 542	5	32	
	6			3 154	15	44			4 234	13	43			5 314	12	43	
	8			4 205	28	52			5 645	24	51			7 085	22	51	
	10			5 256	43	58			7 056	38	57			8 856	34	57	
1100	4	0.220	0.161	2 313	6	32	0.275	0.216	3 105	5	31	0.33	0.271	3 897	5	32	
	6			3 469	15	44			4 657	13	44			5 845	11	43	
	8			4 625	26	52			6 209	23	51			7 793	20	50	
	10			5 782	41	57			7 762	36	57			9 742	32	56	
1200	4	0.240	0.175	2 523	6	33	0.300	0.235	3 387	5	32	0.36	0.295	4 251	4	30	
	6			3 784	14	44			5 080	12	43			6 376	11	43	
	8			5 046	25	51			6 774	22	51			8 502	19	50	
	10			6 307	39	57			8 467	34	57			10 627	30	56	
1300	4	0.260	0.190	2 733	5	31	0.325	0.255	3 669	5	32	0.39	0.320	4 605	4	30	
	6			4 100	13	43			5 504	11	42			6 908	10	42	
	8			5 466	23	51			7 338	20	50			9 210	18	50	
	10			6 833	37	57			9 173	32	56			11 513	28	55	
1400	4	0.280	0.204	2 943	5	31	0.350	0.274	3 951	4	29	0.42	0.344	4 959	4	30	
	6			4 415	12	42			5 927	10	41			7 439	9	41	
	8			5 887	22	50			7 903	19	50			9 919	17	49	
	10			7 358	35	56			9 878	30	56			12 398	27	55	
1500	4	0.300	0.219	3 154	5	31	0.375	0.294	4 234	4	30	0.45	0.369	5 314	4	31	
	6			4 730	12	43			6 350	10	42			7 970	9	41	
	8			6 307	21	50			8 467	18	49			10 627	16	49	
	10			7 884	33	56			10 584	28	55			13 284	25	55	

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		350					400					450					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4	0.070	0.059	852	6	28	0.080	0.069	996	6	29	0.090	0.079	1 140	6	29
		6			1 279	15	40			1 495	14	40			1 711	13	39
		8			1 705	27	48			1 993	25	47			2 281	24	47
		10			2 131	42	53			2 491	40	53			2 851	38	53
	250	4	0.088	0.074	1 066	6	29	0.100	0.087	1 246	6	30	0.113	0.099	1 426	6	30
		6			1 598	15	41			1 868	14	41			2 138	13	40
		8			2 131	27	49			2 491	25	48			2 851	24	48
		10			2 664	42	54			3 114	40	54			3 564	38	54
	300	4	0.105	0.089	1 279	6	30	0.120	0.104	1 495	6	31	0.135	0.119	1 711	6	31
		6			1 918	15	42			2 242	14	42			2 566	13	41
		8			2 557	27	49			2 989	25	49			3 421	24	49
		10			3 197	42	55			3 737	39	55			4 277	37	55
350	4	0.123	0.104	1 492	6	30	0.140	0.121	1 744	6	31	0.158	0.139	1 996	5	29	
	6			2 238	15	42			2 616	14	42			2 994	13	42	
	8			2 984	26	50			3 488	25	50			3 992	23	49	
	10			3 730	41	56			4 360	39	56			4 990	37	55	
400	4	0.140	0.118	1 705	6	31	0.160	0.138	1 993	6	32	0.180	0.158	2 281	5	30	
	6			2 557	14	42			2 989	13	42			3 421	13	42	
	8			3 410	26	50			3 986	24	50			4 562	23	50	
	10			4 262	41	56			4 982	38	56			5 702	36	56	
450	4	0.158	0.133	1 918	6	32	0.180	0.156	2 242	6	32	0.203	0.178	2 566	5	30	
	6			2 877	14	43			3 363	13	42			3 849	13	43	
	8			3 836	26	51			4 484	24	50			5 132	23	50	
	10			4 795	40	56			5 605	38	56			6 415	36	56	
500	4	0.175	0.148	2 131	6	32	0.200	0.173	2 491	6	33	0.225	0.198	2 851	5	31	
	6			3 197	14	43			3 737	13	43			4 277	12	42	
	8			4 262	25	51			4 982	24	51			5 702	22	50	
	10			5 328	40	57			6 228	37	56			7 128	35	56	
550	4	0.193	0.163	2 557	6	32	0.220	0.190	2 740	5	31	0.248	0.218	3 136	5	31	
	6			3 836	14	44			4 110	13	43			4 704	12	43	
	8			5 115	25	51			5 481	23	51			6 273	22	51	
	10			6 394	39	57			6 851	36	56			7 841	34	56	
600	4	0.210	0.178	2 557	6	33	0.240	0.208	2 989	5	31	0.270	0.238	3 421	5	32	
	6			3 836	13	43			4 484	13	44			5 132	12	43	
	8			5 115	24	51			5 979	23	51			6 843	21	50	
	10			6 394	38	57			7 474	36	57			8 554	34	57	
650	4	0.228	0.192	2 771	6	33	0.260	0.225	3 239	5	31	0.293	0.257	3 707	5	32	
	6			4 156	13	43			4 858	12	43			5 560	11	42	
	8			5 541	24	51			6 477	22	51			7 413	21	51	
	10			6 926	37	57			8 096	35	57			9 266	33	57	
700	4	0.245	0.207	2 984	5	31	0.28	0.242	3 488	5	32	0.315	0.277	3 992	5	32	
	6			4 476	13	44			5 232	12	43			5 988	11	43	
	8			5 967	23	51			6 975	22	51			7 983	20	50	
	10			7 459	37	57			8 719	34	57			9 979	32	57	

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		350					400					450					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	750	4	0.263	0.222	3 197	5	31	0.3	0.260	3 737	5	32	0.338	0.297	4 277	5	33
		6			4 795	13	44			5 605	12	44			6 415	11	43
		8			6 394	23	51			7 474	21	51			8 554	20	51
		10			7 992	36	57			9 342	33	57			10 692	31	56
	800	4	0.280	0.237	3 410	5	32	0.32	0.277	3 986	5	32	0.360	0.317	4 562	4	29
		6			5 115	12	43			5 979	11	43			6 843	11	42
		8			6 820	22	51			7 972	21	51			9 124	19	49
		10			8 525	35	57			9 965	32	57			11 405	30	55
	850	4	0.298	0.252	3 623	5	32	0.34	0.294	4 235	5	33	0.383	0.337	4 847	4	29
		6			5 435	12	43			6 353	11	43			7 271	10	41
		8			7 246	22	51			8 470	20	51			9 694	19	49
		10			9 058	34	57			10 588	31	56			12 118	29	55
900	4	0.315	0.266	3 836	5	32	0.360	0.311	4 484	4	30	0.405	0.356	5 132	4	29	
	6			5 754	12	44			6 726	11	43			7 698	10	41	
	8			7 672	21	51			8 968	19	50			10 264	18	49	
	10			9 590	33	57			11 210	31	57			12 830	29	55	
1000	4	0.350	0.296	4 262	5	33	0.400	0.346	4 982	4	30	0.450	0.396	5 702	4	29	
	6			6 394	11	43			7 474	10	42			8 554	9	40	
	8			8 525	20	51			9 965	18	50			11 405	17	48	
	10			10 656	31	56			12 456	29	56			14 256	27	54	
1100	4	0.385	0.326	4 689	4	30	0.440	0.381	5 481	4	31	0.495	0.436	6 273	4	29	
	6			7 033	10	42			8 221	9	41			9 409	9	40	
	8			9 377	19	50			10 961	17	50			12 545	16	47	
	10			11 722	29	56			13 702	27	56			15 682	25	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	3	25	
	6			7 672	10	43			8 968	9	42			10 264	8	38	
	8			10 230	17	49			11 958	16	49			13 686	15	46	
	10			12 787	27	55			14 947	25	55			17 107	23	52	
1300	4	0.455	0.385	5 541	4	31	0.520	0.450	6 477	3	28	0.585	0.515	7 413	3	25	
	6			8 312	9	41			9 716	8	41			11 120	8	38	
	8			11 082	16	49			12 954	15	49			14 826	14	45	
	10			13 853	26	55			16 193	24	55			18 533	22	51	
1400	4	0.490	0.414	5 967	3	27	0.560	0.484	6 975	3	28	0.630	0.554	7 983	3	25	
	6			8 951	8	40			10 463	8	41			11 975	7	36	
	8			11 935	15	48			13 951	14	48			15 967	13	45	
	10			14 918	24	55			17 438	22	54			19 958	20	50	
1500	4	0.525	0.444	6 394	3	28	0.600	0.519	7 474	3	28	0.675	0.594	8 554	3	25	
	6			9 590	8	41			11 210	7	40			12 830	6	34	
	8			12 787	14	48			14 947	13	48			17 107	12	43	
	10			15 984	22	54			18 684	20	53			21 384	19	49	

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		500					550					600					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4	0.1	0.089	1 284	5	27	0.110	0.099	1 428	5	28	0.120	0.109	1 572	5	28
		6			1 927	13	40			2 143	12	39			2 359	12	40
		8			2 569	23	47			2 857	22	47			3 145	21	47
		10			3 211	36	53			3 571	35	53			3 931	34	53
	250	4	0.125	0.112	1 606	5	28	0.138	0.124	1 786	5	29	0.150	0.137	1 966	5	29
		6			2 408	13	41			2 678	12	40			2 948	12	41
		8			3 211	23	48			3 571	22	48			3 931	21	48
		10			4 014	36	54			4 464	35	54			4 914	33	54
	300	4	0.15	0.134	1 927	5	29	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	23	49			4 285	22	49			4 717	21	49
		10			4 817	36	55			5 357	34	55			5 897	33	55
	350	4	0.175	0.156	2 248	5	30	0.193	0.174	2 500	5	30	0.210	0.191	2 752	5	31
		6			3 372	12	41			3 750	12	42			4 128	11	41
		8			4 496	22	49			5 000	21	49			5 504	20	49
		10			5 620	35	55			6 250	34	55			6 880	32	55
	400	4	0.2	0.178	2 569	5	30	0.220	0.198	2 857	5	31	0.240	0.218	3 145	5	31
		6			3 853	12	42			4 285	12	42			4 717	11	42
		8			5 138	22	50			5 714	21	50			6 290	20	49
		10			6 422	35	56			7 142	33	56			7 862	32	56
	450	4	0.225	0.201	2 890	5	31	0.248	0.223	3 214	5	31	0.270	0.246	3 538	5	32
		6			4 335	12	42			4 821	11	42			5 307	11	42
		8			5 780	22	50			6 428	21	50			7 076	20	50
		10			7 225	34	56			8 035	32	56			8 845	31	56
	500	4	0.250	0.223	3 211	5	31	0.275	0.248	3 571	5	32	0.300	0.273	3 931	4	29
		6			4 817	12	43			5 357	11	42			5 897	11	43
		8			6 422	21	50			7 142	20	50			7 862	19	50
		10			8 028	33	56			8 928	32	56			9 828	30	56
550	4	0.275	0.245	3 853	5	32	0.303	0.273	4 285	5	32	0.330	0.300	4 717	4	30	
	6			5 780	11	42			6 428	11	43			7 076	10	42	
	8			7 707	21	51			8 571	20	50			9 435	19	50	
	10			9 634	33	56			10 714	31	56			11 794	30	56	
600	4	0.3	0.268	3 853	5	32	0.330	0.298	4 285	4	30	0.360	0.328	4 717	4	30	
	6			5 780	11	43			6 428	11	43			7 076	10	42	
	8			7 707	20	50			8 571	19	50			9 435	18	50	
	10			9 634	32	56			10 714	30	56			11 794	29	56	
650	4	0.325	0.290	4 175	5	33	0.358	0.322	4 643	4	30	0.390	0.355	5 111	4	31	
	6			6 262	11	43			6 964	10	42			7 666	10	43	
	8			8 349	20	51			9 285	19	50			10 221	18	50	
	10			10 436	31	56			11 606	30	56			12 776	28	56	
700	4	0.350	0.312	4 496	4	30	0.385	0.347	5 000	4	30	0.420	0.382	5 504	4	31	
	6			6 744	11	43			7 500	10	42			8 256	10	43	
	8			8 991	19	50			9 999	18	50			11 007	17	50	
	10			11 239	30	56			12 499	29	56			13 759	27	56	

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		500					550					600					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	750	4	0.375	0.335	4 817	4	30	0.413	0.372	5 357	4	31	0.450	0.410	5 897	4	31
		6			7 225	10	42			8 035	10	43			8 845	9	42
		8			9 634	19	51			10 714	18	50			11 794	17	50
		10			12 042	29	56			13 392	28	56			14 742	27	56
	800	4	0.4	0.357	5 138	4	30	0.440	0.397	5 714	4	31	0.480	0.437	6 290	4	31
		6			7 707	10	42			8 571	9	42			9 435	9	42
		8			10 276	18	50			11 428	17	50			12 580	16	50
		10			12 845	29	56			14 285	27	56			15 725	26	56
	850	4	0.425	0.379	5 459	4	30	0.468	0.422	6 071	4	31	0.510	0.464	6 683	4	32
		6			8 189	10	42			9 107	9	42			10 025	9	42
		8			10 918	18	50			12 142	17	50			13 366	16	50
		10			13 648	28	56			15 178	26	56			16 708	25	56
900	4	0.45	0.401	5 780	4	30	0.495	0.446	6 428	4	32	0.540	0.491	7 076	3	28	
	6			8 670	9	41			9 642	9	42			10 614	8	39	
	8			11 560	17	49			12 856	16	50			14 152	15	47	
	10			14 450	27	55			16 070	25	55			17 690	24	52	
1000	4	0.5	0.446	6 422	4	30	0.550	0.496	6 428	3	28	0.600	0.546	7 862	3	29	
	6			9 634	9	41			9 642	8	41			11 794	8	41	
	8			12 845	16	48			12 856	15	49			15 725	14	49	
	10			16 056	25	54			16 070	24	55			19 656	23	55	
1100	4	0.55	0.491	7 065	3	27	0.605	0.546	7 857	3	29	0.660	0.601	8 649	3	29	
	6			10 597	8	39			11 785	8	41			12 973	7	40	
	8			14 129	15	48			15 713	14	49			17 297	13	48	
	10			17 662	24	54			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	29	0.720	0.655	9 435	3	29	
	6			11 560	8	39			12 856	7	40			14 152	7	41	
	8			15 414	14	47			17 142	13	48			18 870	12	48	
	10			19 267	22	53			21 427	21	54			23 587	20	54	
1300	4	0.65	0.580	8 349	3	27	0.715	0.645	9 285	3	29	0.780	0.710	10 221	2	25	
	6			12 524	7	38			13 928	7	40			15 332	6	39	
	8			16 698	13	46			18 570	12	47			20 442	11	47	
	10			20 873	20	51			23 213	19	53			25 553	18	53	
1400	4	0.7	0.624	8 991	3	27	0.770	0.694	9 999	2	24	0.840	0.764	11 007	2	25	
	6			13 487	6	36			14 999	6	39			16 511	6	39	
	8			17 983	12	45			19 999	11	47			22 015	10	46	
	10			22 478	19	51			24 998	18	53			27 518	17	53	
1500	4	0.75	0.669	9 634	2	21	0.825	0.744	10 714	2	25	0.900	0.819	11 794	2	25	
	6			14 450	6	36			16 070	6	39			17 690	5	37	
	8			19 267	11	43			21 427	10	46			23 587	10	46	
	10			24 084	17	49			26 784	16	52			29 484	15	51	

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		650					700					750					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [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	4	26
		6			2 575	11	39			2 791	11	39			3 007	11	40
		8			3 433	21	47			3 721	20	47			4 009	19	47
		10			4 291	32	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	4	27
		6			3 218	11	40			3 488	11	40			3 758	11	41
		8			4 291	20	48			4 651	20	48			5 011	19	48
		10			5 364	32	54			5 814	31	54			6 264	30	54
	300	4	0.195	0.179	2 575	5	30	0.210	0.194	2 791	4	28	0.225	0.209	3 007	4	28
		6			3 862	11	41			4 186	11	41			4 510	10	40
		8			5 149	20	49			5 581	19	48			6 013	19	49
		10			6 437	32	55			6 977	31	55			7 517	30	55
	350	4	0.228	0.209	3 004	5	31	0.245	0.226	3 256	4	29	0.263	0.244	3 508	4	29
		6			4 506	11	41			4 884	11	42			5 262	10	41
		8			6 008	20	49			6 512	19	49			7 016	18	49
		10			7 510	31	55			8 140	30	55			8 770	29	55
	400	4	0.260	0.238	3 433	4	29	0.280	0.258	3 721	4	29	0.300	0.278	4 009	4	30
		6			5 149	11	42			5 581	10	41			6 013	10	41
		8			6 866	19	49			7 442	19	49			8 018	18	49
		10			8 582	31	56			9 302	30	55			10 022	29	55
	450	4	0.293	0.268	3 862	4	29	0.315	0.291	4 186	4	30	0.338	0.313	4 510	4	30
		6			5 793	10	41			6 279	10	42			6 765	10	42
		8			7 724	19	50			8 372	18	49			9 020	18	50
		10			9 655	30	56			10 465	29	56			11 275	28	55
	500	4	0.325	0.298	4 291	4	30	0.350	0.323	4 651	4	30	0.375	0.348	5 011	4	30
		6			6 437	10	42			6 977	10	42			7 517	10	42
		8			8 582	19	50			9 302	18	50			10 022	17	49
		10			10 728	29	56			11 628	28	56			12 528	27	55
550	4	0.358	0.328	5 149	4	30	0.385	0.355	5 116	4	31	0.413	0.383	5 512	4	31	
	6			7 724	10	42			7 674	10	43			8 268	9	41	
	8			10 299	18	50			10 233	17	49			11 025	17	50	
	10			12 874	29	56			12 791	28	56			13 781	27	56	
600	4	0.390	0.358	5 149	4	31	0.420	0.388	5 581	4	31	0.450	0.418	6 013	4	31	
	6			7 724	10	43			8 372	9	42			9 020	9	42	
	8			10 299	18	50			11 163	17	50			12 027	16	49	
	10			12 874	28	56			13 954	27	56			15 034	26	56	
650	4	0.423	0.387	5 579	4	31	0.455	0.420	6 047	4	31	0.488	0.452	6 515	4	32	
	6			8 368	9	42			9 070	9	42			9 772	9	42	
	8			11 157	17	50			12 093	17	50			13 029	16	50	
	10			13 946	27	56			15 116	26	56			16 286	25	55	
700	4	0.455	0.417	6 008	4	31	0.490	0.452	6 512	4	32	0.525	0.487	7 016	3	28	
	6			9 012	9	42			9 768	9	42			10 524	8	41	
	8			12 015	17	50			13 023	16	50			14 031	15	49	
	10			15 019	26	56			16 279	25	55			17 539	24	55	

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		650					700					750					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	750	4			6 437	4	32			6 977	4	32			7 517	3	28
		6	0.488	0.447	9 655	9	42	0.525	0.485	10 465	9	42	0.563	0.522	11 275	8	41
		8			12 874	16	50			13 954	16	50			15 034	15	49
		10			16 092	26	56			17 442	25	56			18 792	24	56
	800	4			6 866	4	32			7 442	3	26			8 018	3	29
		6	0.520	0.477	10 299	9	42	0.560	0.517	11 163	8	39	0.600	0.557	12 027	8	42
		8			13 732	16	50			14 884	15	47			16 036	14	49
		10			17 165	25	55			18 605	24	52			20 045	23	55
	850	4			7 295	3	28			7 907	3	29			8 519	3	29
		6	0.553	0.507	10 943	8	41	0.595	0.549	11 861	8	41	0.638	0.592	12 779	8	42
		8			14 590	15	49			15 814	15	50			17 038	14	49
		10			18 238	24	55			19 768	23	55			21 298	22	55
900	4			7 724	3	28			8 372	3	29			9 020	3	29	
	6	0.585	0.536	11 586	8	41	0.630	0.581	12 558	8	42	0.675	0.626	13 530	7	40	
	8			15 448	15	49			16 744	14	49			18 040	13	48	
	10			19 310	23	54			20 930	22	55			22 550	21	55	
1000	4			8 582	3	28			9 302	3	29			10 022	3	30	
	6	0.650	0.596	12 874	7	39	0.700	0.646	13 954	7	40	0.750	0.696	15 034	7	41	
	8			17 165	14	48			18 605	13	49			20 045	13	49	
	10			21 456	22	54			23 256	21	55			25 056	20	54	
1100	4			9 441	3	28			10 233	3	30			11 025	3	30	
	6	0.715	0.656	14 161	7	39	0.770	0.711	15 349	7	41	0.825	0.766	16 537	6	39	
	8			18 881	13	47			20 465	12	48			22 049	12	48	
	10			23 602	20	53			25 582	19	54			27 562	18	53	
1200	4			10 299	3	28			11 163	2	25			12 027	2	25	
	6	0.780	0.715	15 448	6	37	0.840	0.775	16 744	6	39	0.900	0.835	18 040	6	40	
	8			20 598	12	46			22 326	11	47			24 054	11	47	
	10			25 747	19	52			27 907	18	54			30 067	17	53	
1300	4			11 157	2	23			12 093	2	25			13 029	2	26	
	6	0.845	0.775	16 736	6	37	0.910	0.840	18 140	6	40	0.975	0.905	19 544	5	38	
	8			22 314	11	45			24 186	10	46			26 058	10	47	
	10			27 893	17	50			30 233	16	52			32 573	16	53	
1400	4			12 015	2	23			13 023	2	26			14 031	2	26	
	6	0.910	0.834	18 023	5	34	0.980	0.904	19 535	5	38	1.050	0.974	21 047	5	38	
	8			24 031	10	44			26 047	9	45			28 063	9	46	
	10			30 038	16	50			32 558	15	52			35 078	14	51	
1500	4			12 874	2	23			13 954	2	26			15 034	2	26	
	6	0.975	0.894	19 310	5	34	1.050	0.969	20 930	5	38	1.125	1.044	22 550	4	35	
	8			25 747	9	42			27 907	9	45			30 067	8	44	
	10			32 184	14	48			34 884	14	51			37 584	13	51	

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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		800					850					900					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4	0.160	0.149	2 148	4	27	0.170	0.159	2 292	4	27	0.180	0.169	2 436	4	27
		6			3 223	10	39			3 439	10	39			3 655	10	39
		8			4 297	19	47			4 585	18	47			4 873	18	47
		10			5 371	30	53			5 731	29	53			6 091	28	53
	250	4	0.200	0.187	2 686	4	28	0.213	0.199	2 866	4	28	0.225	0.212	3 046	4	28
		6			4 028	10	40			4 298	10	40			4 568	10	40
		8			5 371	19	48			5 731	18	48			6 091	18	48
		10			6 714	29	54			7 164	29	54			7 614	28	54
	300	4	0.240	0.224	3 223	4	29	0.255	0.239	3 439	4	29	0.270	0.254	3 655	4	29
		6			4 834	10	40			5 158	10	41			5 482	10	41
		8			6 445	18	48			6 877	18	48			7 309	17	48
		10			8 057	29	54			8 597	28	54			9 137	27	54
	350	4	0.280	0.261	3 760	4	29	0.298	0.279	4 012	4	30	0.315	0.296	4 264	4	30
		6			5 640	10	41			6 018	10	41			6 396	9	40
		8			7 520	18	49			8 024	17	48			8 528	17	49
		10			9 400	28	55			10 030	28	55			10 660	27	55
	400	4	0.320	0.298	4 297	4	30	0.340	0.318	4 585	4	30	0.360	0.338	4 873	4	30
		6			6 445	10	42			6 877	9	41			7 309	9	41
		8			8 594	18	49			9 170	17	49			9 746	17	49
		10			10 742	28	55			11 462	27	55			12 182	26	55
	450	4	0.360	0.336	4 834	4	30	0.383	0.358	5 158	4	31	0.405	0.381	5 482	4	31
		6			7 251	9	41			7 737	9	41			8 223	9	41
		8			9 668	17	49			10 316	17	49			10 964	16	49
		10			12 085	27	55			12 895	26	55			13 705	26	55
	500	4	0.400	0.373	5 371	4	31	0.425	0.398	5 731	4	31	0.450	0.423	6 091	4	31
		6			8 057	9	41			8 597	9	42			9 137	9	42
		8			10 742	17	50			11 462	16	49			12 182	16	49
		10			13 428	26	55			14 328	26	55			15 228	25	55
550	4	0.440	0.410	5 908	4	31	0.468	0.438	6 304	4	31	0.495	0.465	6 700	3	28	
	6			8 862	9	42			9 456	9	42			10 050	8	41	
	8			11 817	16	49			12 609	16	50			13 401	15	49	
	10			14 771	26	56			15 761	25	55			16 751	24	55	
600	4	0.480	0.448	6 445	4	32	0.510	0.478	6 877	3	28	0.540	0.508	7 309	3	28	
	6			9 668	9	42			10 316	8	41			10 964	8	41	
	8			12 891	16	50			13 755	15	49			14 619	15	49	
	10			16 114	25	55			17 194	24	55			18 274	24	55	
650	4	0.520	0.485	6 983	3	28	0.553	0.517	7 451	3	28	0.585	0.550	7 919	3	29	
	6			10 474	8	41			11 176	8	41			11 878	8	41	
	8			13 965	15	49			14 901	15	49			15 837	14	49	
	10			17 456	24	55			18 626	24	56			19 796	23	55	
700	4	0.560	0.522	7 520	3	28	0.595	0.557	8 024	3	29	0.630	0.592	8 528	3	29	
	6			11 280	8	41			12 036	8	42			12 792	8	42	
	8			15 039	15	49			16 047	14	49			17 055	14	49	
	10			18 799	24	56			20 059	23	55			21 319	22	55	

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		800					850					900					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	750	4			8 057	3	29			8 597	3	29			9 137	3	29
		6	0.600	0.560	12 085	8	42	0.638	0.597	12 895	8	42	0.675	0.635	13 705	7	40
		8			16 114	14	49			17 194	14	49			18 274	14	49
		10			20 142	23	55			21 492	22	55			22 842	21	55
	800	4			8 594	3	29			9 170	3	29			9 746	3	30
		6	0.640	0.597	12 891	8	42	0.680	0.637	13 755	7	40	0.720	0.677	14 619	7	41
		8			17 188	14	49			18 340	13	48			19 492	13	49
		10			21 485	22	55			22 925	21	55			24 365	21	55
	850	4			9 131	3	29			9 743	3	30			10 355	3	30
		6	0.680	0.634	13 697	7	40	0.723	0.677	14 615	7	41	0.765	0.719	15 533	7	41
		8			18 262	13	48			19 486	13	49			20 710	13	49
		10			22 828	21	55			24 358	21	55			25 888	20	55
900	4			9 668	3	30			10 316	3	30			10 964	3	30	
	6	0.720	0.671	14 502	7	41	0.765	0.716	15 474	7	41	0.810	0.761	16 446	7	41	
	8			19 336	13	49			20 632	13	49			21 928	12	48	
	10			24 170	21	55			25 790	20	55			27 410	19	54	
1000	4			10 742	3	30			11 462	3	30			12 182	2	25	
	6	0.800	0.746	16 114	7	41	0.850	0.796	17 194	6	39	0.900	0.846	18 274	6	40	
	8			21 485	12	48			22 925	12	48			24 365	11	48	
	10			26 856	19	54			28 656	18	54			30 456	18	54	
1100	4			11 817	2	25			12 609	2	25			13 401	2	26	
	6	0.880	0.821	17 725	6	39	0.935	0.876	18 913	6	40	0.990	0.931	20 101	6	40	
	8			23 633	11	47			25 217	11	48			26 801	10	47	
	10			29 542	18	54			31 522	17	53			33 502	16	53	
1200	4			12 891	2	26			13 755	2	26			14 619	2	26	
	6	0.960	0.895	19 336	6	40	1.020	0.955	20 632	5	38	1.080	1.015	21 928	5	38	
	8			25 782	10	47			27 510	10	47			29 238	9	46	
	10			32 227	16	53			34 387	16	53			36 547	15	52	
1300	4			13 965	2	26			14 901	2	26			15 837	2	26	
	6	1.040	0.970	20 948	5	38	1.105	1.035	22 352	5	38	1.170	1.100	23 756	5	38	
	8			27 930	9	45			29 802	9	46			31 674	9	46	
	10			34 913	15	52			37 253	14	52			39 593	14	52	
1400	4			15 039	2	26			16 047	2	27			17 055	2	27	
	6	1.120	1.044	22 559	5	38	1.190	1.114	24 071	4	36	1.260	1.184	25 583	4	36	
	8			30 079	9	46			32 095	8	45			34 111	8	45	
	10			37 598	14	52			40 118	13	51			42 638	13	51	
1500	4			16 114	2	27			17 194	1	18			18 274	1	18	
	6	1.200	1.119	24 170	4	36	1.275	1.194	25 790	4	36	1.350	1.269	27 410	4	36	
	8			32 227	8	45			34 387	7	43			36 547	7	43	
	10			40 284	12	50			42 984	12	50			45 684	11	49	

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		1000					1100					1200					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4	0.200	0.189	2 724	4	28	0.220	0.209	3 012	4	28	0.240	0.229	3 300	4	29
		6			4 087	9	38			4 519	9	39			4 951	9	39
		8			5 449	17	47			6 025	16	46			6 601	16	47
		10			6 811	27	53			7 531	26	53			8 251	25	53
	250	4	0.250	0.237	3 406	4	29	0.275	0.262	3 766	4	29	0.300	0.287	4 126	4	30
		6			5 108	9	39			5 648	9	40			6 188	9	40
		8			6 811	17	48			7 531	16	47			8 251	16	48
		10			8 514	27	54			9 414	25	53			10 314	25	54
	300	4	0.300	0.284	4 087	4	30	0.330	0.314	4 519	4	30	0.360	0.344	4 951	3	27
		6			6 130	9	40			6 778	9	41			7 426	8	39
		8			8 173	17	48			9 037	16	48			9 901	15	48
		10			10 217	26	54			11 297	25	54			12 377	24	54
	350	4	0.350	0.331	4 768	4	30	0.385	0.366	5 272	3	27	0.420	0.401	5 776	3	27
		6			7 152	9	41			7 908	8	40			8 664	8	40
		8			9 536	16	48			10 544	15	48			11 552	15	48
		10			11 920	26	55			13 180	24	54			14 440	24	54
	400	4	0.400	0.378	5 449	4	31	0.440	0.418	6 025	3	28	0.480	0.458	6 601	3	28
		6			8 173	9	41			9 037	8	40			9 901	8	41
		8			10 898	16	49			12 050	15	48			13 202	14	48
		10			13 622	25	55			15 062	24	55			16 502	23	54
	450	4	0.450	0.426	6 130	3	28	0.495	0.471	6 778	3	28	0.540	0.516	7 426	3	28
		6			9 195	8	40			10 167	8	41			11 139	8	41
		8			12 260	15	49			13 556	15	49			14 852	14	49
		10			15 325	24	55			16 945	23	55			18 565	22	54
	500	4	0.500	0.473	6 811	3	28	0.550	0.523	7 531	3	28	0.600	0.573	8 251	3	29
		6			10 217	8	41			11 297	8	41			12 377	7	40
		8			13 622	15	49			15 062	14	49			16 502	14	49
		10			17 028	24	55			18 828	23	55			20 628	22	55
550	4	0.550	0.520	7 492	3	28	0.605	0.575	8 284	3	29	0.660	0.630	9 076	3	29	
	6			11 238	8	41			12 426	8	42			13 614	7	40	
	8			14 985	15	49			16 569	14	49			18 153	13	48	
	10			18 731	23	55			20 711	22	55			22 691	21	55	
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	30	
	6			12 260	8	42			13 556	7	40			14 852	7	41	
	8			16 347	14	49			18 075	13	48			19 803	13	49	
	10			20 434	22	55			22 594	21	55			24 754	20	54	
650	4	0.650	0.615	8 855	3	29	0.715	0.680	9 791	3	30	0.780	0.745	10 727	3	30	
	6			13 282	7	40			14 686	7	41			16 090	7	41	
	8			17 709	14	49			19 581	13	49			21 453	12	48	
	10			22 136	22	55			24 476	21	55			26 816	20	55	
700	4	0.700	0.662	9 536	3	30	0.770	0.732	10 544	3	30	0.840	0.802	11 552	3	30	
	6			14 304	7	41			15 816	7	41			17 328	7	41	
	8			19 071	13	49			21 087	13	49			23 103	12	48	
	10			23 839	21	55			26 359	20	55			28 879	19	54	

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		1000					1100					1200					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	750	4			10 217	3	30			11 297	3	30			12 377	3	31
		6	0.750	0.710	15 325	7	41	0.825	0.785	16 945	7	41	0.900	0.860	18 565	6	40
		8			20 434	13	49			22 594	12	48			24 754	12	49
		10			25 542	20	55			28 242	19	54			30 942	18	54
	800	4			10 898	3	30			12 050	3	31			13 202	2	26
		6	0.800	0.757	16 347	7	41	0.880	0.837	18 075	6	40	0.960	0.917	19 803	6	40
		8			21 796	12	48			24 100	12	49			26 404	11	48
		10			27 245	20	55			30 125	19	55			33 005	18	54
	850	4			11 579	3	30			12 803	2	26			14 027	2	26
		6	0.850	0.804	17 369	6	39	0.935	0.889	19 205	6	40	1.020	0.974	21 041	6	40
		8			23 158	12	48			25 606	11	48			28 054	11	48
		10			28 948	19	54			32 008	18	54			35 068	17	54
900	4			12 260	2	25			13 556	2	26			14 852	2	26	
	6	0.900	0.851	18 390	6	40	0.990	0.941	20 334	6	40	1.080	1.031	22 278	6	40	
	8			24 520	11	48			27 112	11	48			29 704	10	47	
	10			30 650	18	54			33 890	17	54			37 130	16	53	
1000	4			13 622	2	26			15 062	2	26			16 502	2	27	
	6	1.000	0.946	20 434	6	40	1.100	1.046	22 594	5	38	1.200	1.146	24 754	5	39	
	8			27 245	11	48			30 125	10	47			33 005	9	46	
	10			34 056	17	54			37 656	16	53			41 256	15	53	
1100	4			14 985	2	26			16 569	2	27			18 153	2	27	
	6	1.100	1.041	22 477	5	38	1.210	1.151	24 853	5	39	1.320	1.261	27 229	5	39	
	8			29 969	10	47			33 137	9	46			36 305	9	47	
	10			37 462	15	52			41 422	14	52			45 382	14	52	
1200	4			16 347	2	27			18 075	2	27			19 803	2	27	
	6	1.200	1.135	24 520	5	39	1.320	1.255	27 112	4	36	1.440	1.375	29 704	4	36	
	8			32 694	9	46			36 150	8	45			39 606	8	45	
	10			40 867	14	52			45 187	13	51			49 507	13	52	
1300	4			17 709	2	27			19 581	2	27						
	6	1.300	1.230	26 564	4	36	1.430	1.360	29 372	4	36						
	8			35 418	8	45			39 162	8	45						
	10			44 273	13	51			48 953	12	51						
1400	4			19 071	1	18											
	6	1.400	1.324	28 607	4	36											
	8			38 143	7	44											
	10			47 678	12	51											
1500	4			20 434	1	19											
	6	1.500	1.419	30 650	4	37											
	8			40 867	7	44											
	10			51 084	11	50											

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S_k – duct cross-section [m²]
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d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		1300					1400					1500					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4	0.260	0.249	3 588	3	25	0.280	0.269	3 876	3	26	0.300	0.289	4 164	3	26
		6			5 383	8	38			5 815	8	38			6 247	8	39
		8			7 177	15	46			7 753	15	47			8 329	14	46
		10			8 971	24	52			9 691	23	52			10 411	23	52
	250	4	0.325	0.312	4 486	3	26	0.350	0.337	4 846	3	27	0.375	0.362	4 164	3	27
		6			6 728	8	39			7 268	8	39			6 247	8	40
		8			8 971	15	47			9 691	14	47			8 329	14	47
		10			11 214	24	53			12 114	23	53			10 411	22	53
	300	4	0.390	0.374	5 383	3	27	0.420	0.404	5 815	3	27	0.450	0.434	6 247	3	28
		6			8 074	8	40			8 722	8	40			9 370	8	40
		8			10 765	15	48			11 629	14	47			12 493	14	48
		10			13 457	23	54			14 537	22	53			15 617	22	54
350	4	0.455	0.436	6 280	3	28	0.490	0.471	6 784	3	28	0.525	0.506	7 288	3	28	
	6			9 420	8	40			10 176	8	41			10 932	7	39	
	8			12 560	14	48			13 568	14	48			14 576	13	47	
	10			15 700	23	54			16 960	22	54			18 220	21	54	
400	4	0.520	0.498	7 177	3	28	0.560	0.538	7 753	3	29	0.600	0.578	8 329	3	29	
	6			10 765	8	41			11 629	7	40			12 493	7	40	
	8			14 354	14	48			15 506	13	48			16 658	13	48	
	10			17 942	22	54			19 382	21	54			20 822	21	54	
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	29	
	6			12 111	7	40			13 083	7	40			14 055	7	40	
	8			16 148	14	49			17 444	13	48			18 740	13	49	
	10			20 185	21	54			21 805	21	54			23 425	20	54	
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	41			15 617	7	41	
	8			17 942	13	48			19 382	13	49			20 822	12	48	
	10			22 428	21	55			24 228	20	54			26 028	19	54	
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	30	
	6			14 802	7	41			15 990	7	41			17 178	6	39	
	8			19 737	13	49			21 321	12	48			22 905	12	48	
	10			24 671	20	54			26 651	19	54			28 631	19	54	
600	4	0.780	0.748	10 765	3	30	0.840	0.808	11 629	3	30	0.900	0.868	12 493	2	25	
	6			16 148	7	41			17 444	6	39			18 740	6	40	
	8			21 531	12	48			23 259	12	48			24 987	11	48	
	10			26 914	20	55			29 074	19	54			31 234	18	54	
650	4	0.845	0.810	11 663	3	30	0.910	0.875	12 599	2	25	0.975	0.940	13 535	2	26	
	6			17 494	6	39			18 898	6	40			20 302	6	40	
	8			23 325	12	48			25 197	11	48			27 069	11	48	
	10			29 156	19	54			31 496	18	54			33 836	18	54	
700	4	0.910	0.872	12 560	2	25	0.980	0.942	13 568	2	26	1.050	1.012	14 576	2	26	
	6			18 840	6	40			20 352	6	40			21 864	6	40	
	8			25 119	11	48			27 135	11	48			29 151	11	48	
	10			31 399	18	54			33 919	17	54			36 439	17	54	

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S_k – duct cross-section [m²]
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Q – flow [m³/h]
d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		1300					1400					1500					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	750	4			13 457	2	26			14 537	2	26			15 617	2	26
		6	0.975	0.935	20 185	6	40	1.050	1.010	21 805	6	40	1.125	1.085	23 425	6	41
		8			26 914	11	48			29 074	11	48			31 234	10	47
		10			33 642	18	54			36 342	17	54			39 042	16	53
	800	4			14 354	2	26			15 506	2	26			16 658	2	27
		6	1.040	0.997	21 531	6	40	1.120	1.077	23 259	6	41	1.200	1.157	24 987	5	39
		8			28 708	11	48			31 012	10	47			33 316	10	48
		10			35 885	17	54			38 765	16	53			41 645	16	54
	850	4			15 251	2	26			16 475	2	27			17 699	2	27
		6	1.105	1.059	22 877	6	41	1.190	1.144	24 713	5	39	1.275	1.229	26 549	5	39
		8			30 502	10	47			32 950	10	48			35 398	9	47
		10			38 128	16	53			41 188	16	54			44 248	15	53
900	4			16 148	2	27			17 444	2	27			18 740	2	27	
	6	1.170	1.121	24 222	5	38	1.260	1.211	26 166	5	39	1.350	1.301	28 110	5	39	
	8			32 296	10	47			34 888	9	46			37 480	9	47	
	10			40 370	16	54			43 610	15	53			46 850	14	53	
1000	4			17 942	2	27			19 382	2	27			20 822	2	28	
	6	1.300	1.246	26 914	5	39	1.400	1.346	29 074	5	39	1.500	1.446	31 234	4	37	
	8			35 885	9	47			38 765	9	47			41 645	8	46	
	10			44 856	14	52			48 456	14	53			52 056	13	52	
1100	4			19 737	2	27											
	6	1.430	1.371	29 605	4	36											
	8			39 473	8	45											
	10			49 342	13	52											

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

4.7 | Estimated weight of the 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						

4.8 | Accessories

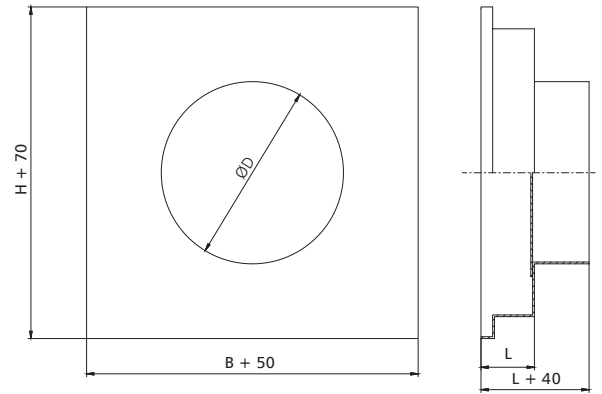
4.8.1 | mcr KRP connection stub

mcr KRP connection stubs are used to connect a circular ventilation duct to a rectangular damper. The connection is a „bare end“ pipe. The diameter of the stub pipe is 2 mm smaller than the diameter of the ventilation duct.

NOTE: due to the asymmetrical position of the fire blade in the damper casing, the connection stubs are of different lengths L, depending on the side of the damper on which they are to be used. Stubs are supplied for both sides of the damper.

Dimensions:

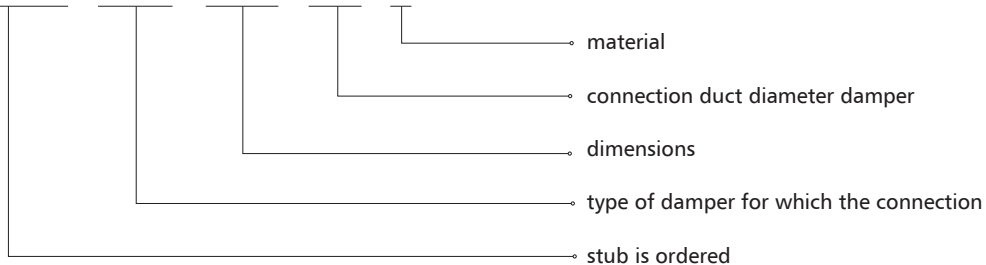
- » BxH - damper dimensions [mm]
- » ØD - diameter of the connection duct [mm]
- » L - length [mm] calculated from the formula: H/2-50 for one connection side and H/2-150 for the other connection side



dimensions in [mm]

Marking:

mcr KRP / FID S / B x H / DIA / X

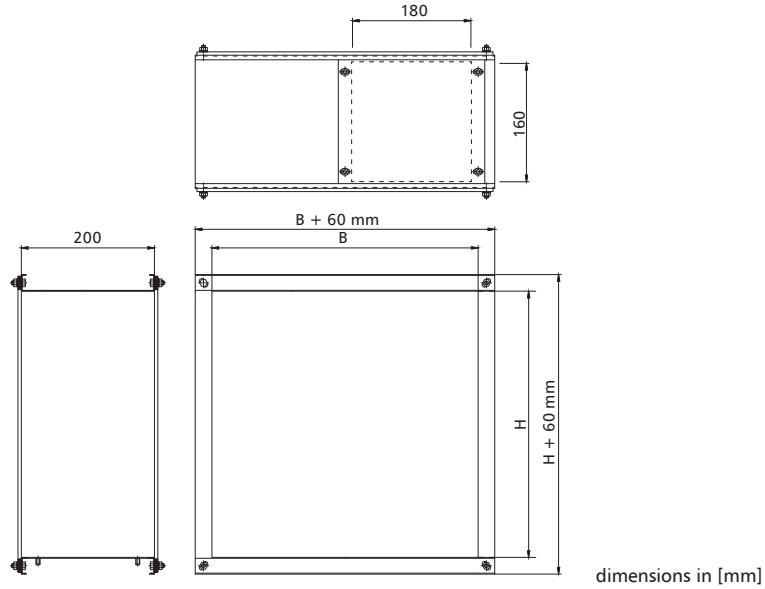


- X – material
- [no symbol] – galvanized steel, Zn 275 g/m² coating
- KN – stainless steel
- KK – 1.4404 acid-proof steel

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

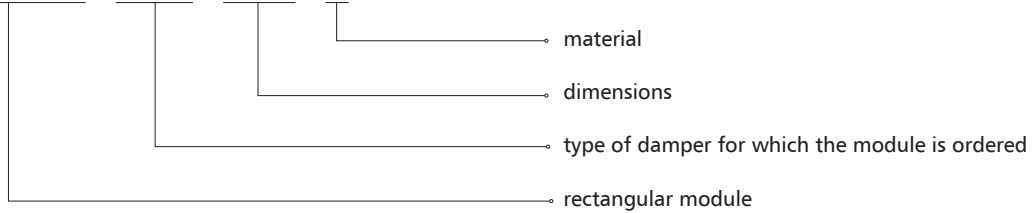
4.8.2 | Casing module with KRW-type inspection access

The casing modules with a KRW-type inspection access are made of sheet metal and equipped with connection flanges. The casing features an inspection access opening with a cover. The module enables to access the damper blade or a drive train quickly without having to dismantle the damper or the duct on which it is installed.



Marking:

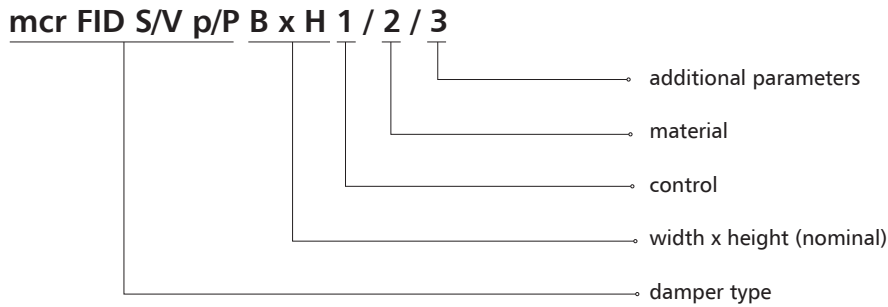
mcr KRW P / FID S / B x H / X



- X – material
- [no symbol] – galvanized steel, Zn 275 g/m² coating
- KN – stainless steel
- KK – 1.4404 acid-proof steel

mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

4.9 | Marking



1 - control:

» trigger and control mechanism, axial actuator

BE24 – actuator without a return spring, U = 24 V AC/DC

BEN24 – actuator without a return spring, U = 24 V AC/DC

BEE24 – actuator without a return spring, U = 24 V AC/DC

BE24-ST (with the BKNE230-24 option) – actuator without a return spring, U = 24 V AC/DC, w/plug for the SBS control system

BEE24-ST (with the BKNE230-24 option) – actuator without a return spring, U = 24 V AC/DC, w/plug for the SBS control system

BEN24-ST – actuator without a return spring, U = 24 V AC/DC, w/plug for the SBS control system

BE230 – actuator without a return spring, U = 230 V AC

BEN230 – actuator without a return spring, U = 230 V AC

BEE230 – actuator without a return spring, U = 230 V AC

2 - material

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

KN – stainless steel

KK – 1.4404 acid-proof steel

3 - additional parameters

» Control mechanism position

[no symbol] – perpendicular to the damper rotation axis

WOK – along the damper rotation axis

» Damper axis of rotation

[no symbol] – horizontal axis of rotation

PP_D – vertical axis of rotation – mechanism at the bottom of the damper

PP_G – vertical axis of rotation - mechanism at the top of the damper

» Design standard

[no symbol] – right damper

KL – left damper

KO – inverted damper

» Extended damper casing

[no symbol] – standard casing length

400 – casing with a length of 400 mm

NOTE: separate additional parameters entered with the “/” sign

example marking:

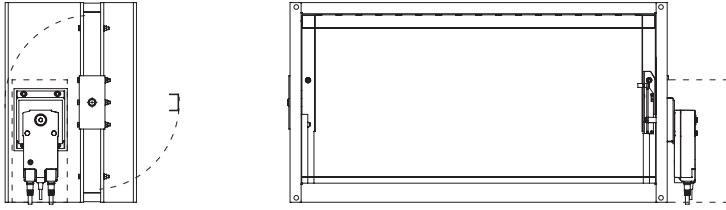
mcr FID S/V p/P 400 x 400 BEN24

Smoke control damper for fire ventilation systems with a 24 V actuator with limit switches.

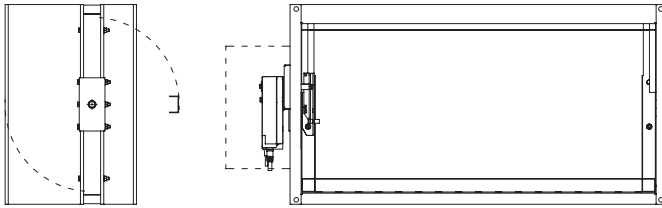
mcr FID S/V p/P, mcr FID S/V-M p/P | Single-blade smoke control dampers for multi-compartment fire ventilation systems

4.9.1 | Design standard

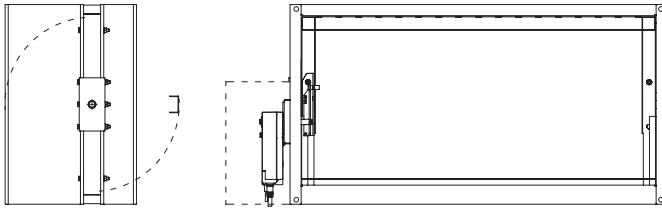
» right damper - standard



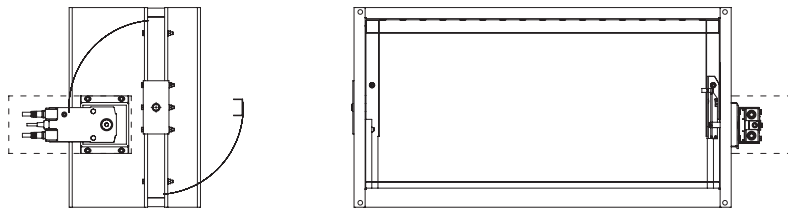
» inverted damper - (ducts facing downwards)



» left damper



» along the damper axis



Chapter 16 - power supply and control (p. 262) contains the following information:
- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper.

mcr FID PRO | Low-resistance circular single-blade cut-off fire dampers for comfort ventilation systems



downloadable models
on the website
under the designer zone tab



HYGIENIC CERTIFICATE



- » **EIS120**
- » Fire resistance class: EI120 ($v_e h_o i \leftrightarrow o$)S, EI180 ($h_o i \leftrightarrow o$)S.
- » Certificate of constancy of performance 2434-CPR-0009.
- » Dampers certified for compliance with EN 15650.
- » Dampers qualified under EN 13501-3 and tested under EN 1366-2.
- » Cut-off dampers with a fire resistance rating independent of the airflow direction and installation side.
- » Lower acoustic noise and hydraulic resistance in the system achieved through a reduction of damper blade thickness.
- » Certified installation of dampers in close proximity.
- » Certified installation of dampers at a distance from construction partitions.
- » Certified damper dry installation in mineral wool.

5.1 | Application

mcr FID PRO low-resistance cut-off dampers are designed for installation in comfort ventilation systems at installation passages through vertical and horizontal construction partitions. They are installed for example in systems with higher acoustic parameters requirements. During a fire, they preserve the fire resistance rating of the construction partition that the ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and fire gasses 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. Admissible flow velocity in the connected duct is 12 m/s for dampers with actuators and 10 m/s for fusible link dampers.

The dampers cannot be operated in systems exposed to dust, unless included in a special, individually developed service and technical inspections programme.

In the version designed for explosion hazard zones (EX version), the dampers can be operated in gas explosion hazard zone 1 inside and outside ventilation ducts and in dust explosion hazard zone 21 outside these ducts. The dampers have been certified in compliance with the ATEX directive 94/9/EC and meet the requirements of group II category 2G and -/2D:

- » II 2G Ex h IIC T6 Gb
- » II -/2D Ex h IIIC T72° -/Db

Ambient temperature: T_a : -20° ... +50° C

5.2 | Design



mcr FID PRO | Low-resistance circular single-blade cut-off fire dampers for comfort ventilation systems

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 galvanized metal sheets. A special casing is used for chemically aggressive environments, which features steel elements made of 1.4404 acid-proof steel sheet, while other elements are impregnated. In the middle part, where the damper blade is placed, the casing is perforated along a width that depends on the blade diameter and thickness. On the damper circumference, around the closed damper blade, there is an intumescent gasket. The insulation blade is made of a 20 mm thick fire-proof panel for dampers with diameters from 100 mm to 200 mm, or a 40 mm thick fire-proof panel for dampers with diameters from 201 to 315 mm, and EIS120 damper fire resistance rating. For the EIS60 damper fire resistance rating, the blade thickness is 15 mm. The blade is covered on both sides with metal sheets to ensure mechanical reinforcement and reduction of friction resistance. A ventilation gasket is installed on the perimeter of the blade, ensuring tightness of the dampers at ambient temperature. Both ends of the casing are terminated with a nipple (standard) or muff connection. Nipple dampers are made without external rubber perimeter gaskets as a standard. Upon the customer's request, dampers may be supplied with a perimeter lip gasket.

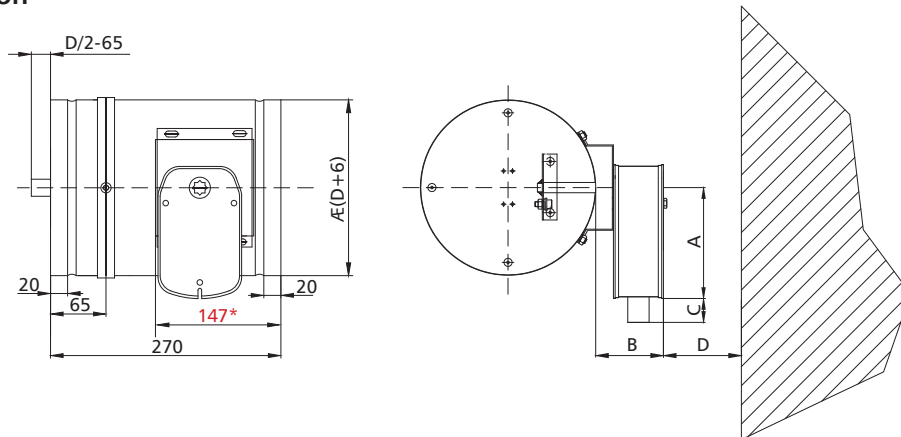
5.3 | Versions

5.3.1 | Damper closing and opening with an actuator

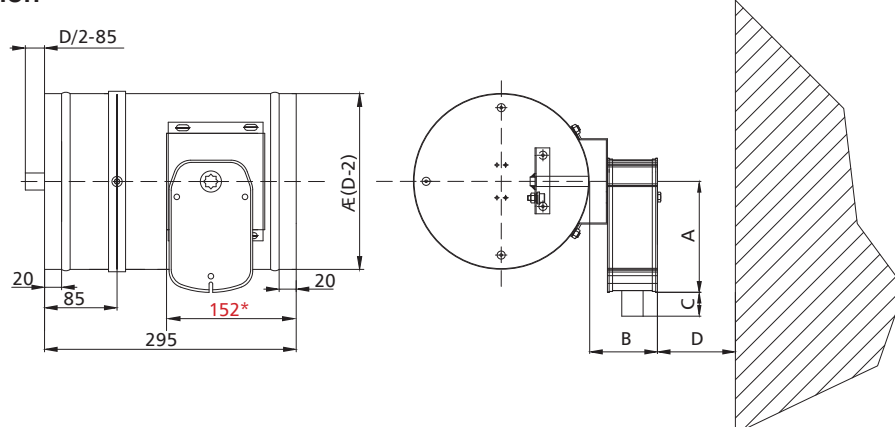
During normal operation, the fire damper blade remains open. In case of fire, the blade closes automatically or remotely when the power supply is cut off.

mcr FID PRO dampers are equipped with a trigger control mechanism in the form of BFL, MLF, EXBF or BF-TL series axial actuator with a return spring, supplied with 24 V AC/DC or 230 V AC, with a 72°C thermoelectric trigger (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, a mechanical position indicator is placed on the actuator. Thermoelectric triggers are equipped with a test switch. Dampers with analog actuators close as a result of the thermoelectric trigger tripping or power supply cut-off as a result of the actuator return spring action. The dampers open when power supply voltage is applied to the actuator terminals. Dampers with those actuators may be opened manually using a key.

» muff version



» nipple version

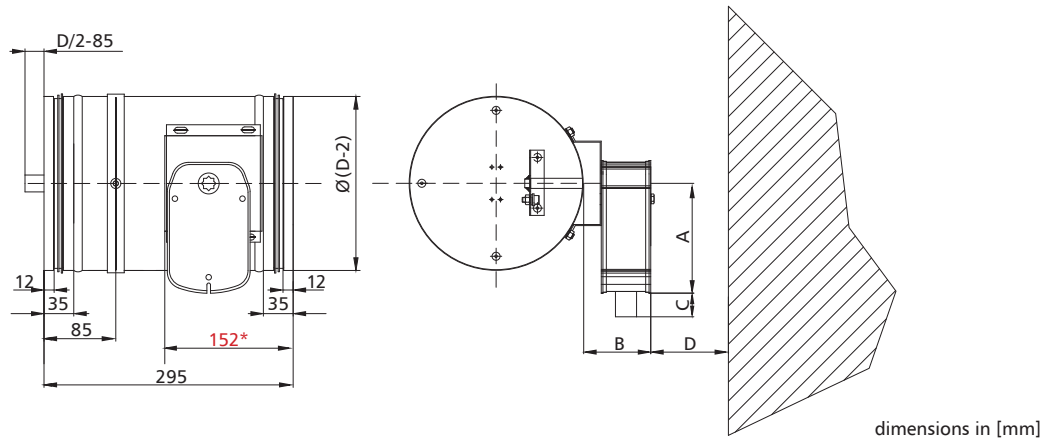


dimensions in [mm]

*embedding border

mcr FID PRO | Low-resistance circular single-blade cut-off fire dampers for comfort ventilation systems

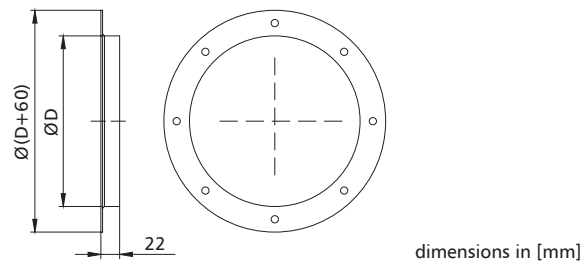
» version with UKW perimeter gasket



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

*embedding border

» connection flange



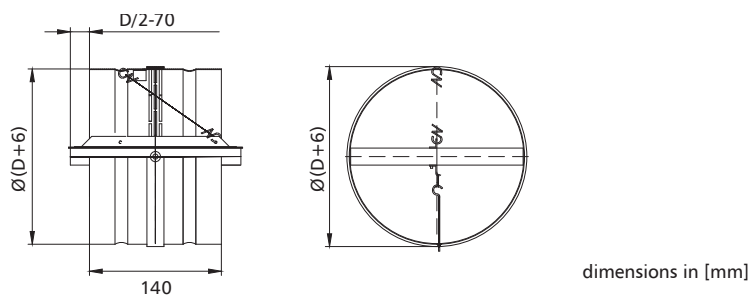
Spacing and number of openings according to EN 12220 (dimensions of circular flanges for general ventilation).

5.3.2 | mcr FID PRO – cut-off fire damper for ventilation ducts with a spring drive and thermal trigger

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

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 74°C thermal trigger (optionally 95°C) is installed outside the damper mechanism, on the damper blade itself. Once the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. It is possible to equip the damper with WK1 or WK2 limit switches used to signal the blade position.

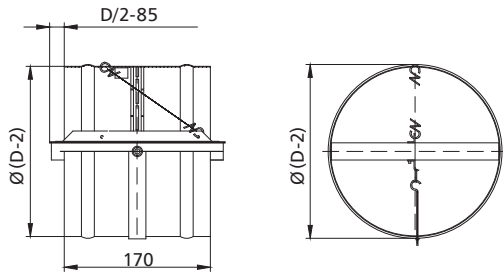
» muff version



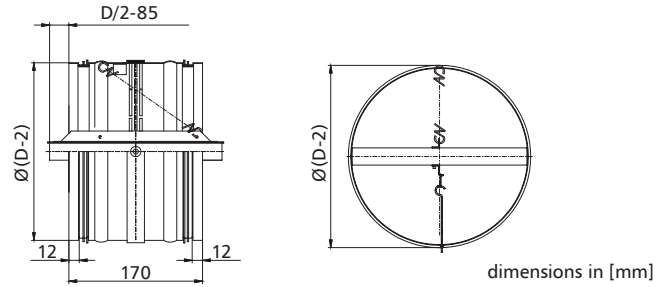
insert symmetrically against the wall axis

mcr FID PRO | Low-resistance circular single-blade cut-off fire dampers for comfort ventilation systems

» nipple version

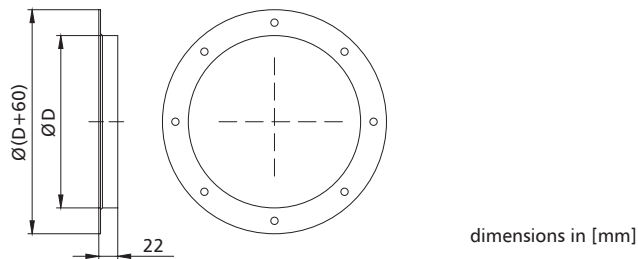


» version with an UKW perimeter gasket



insert symmetrically against the wall axis

» connection flange



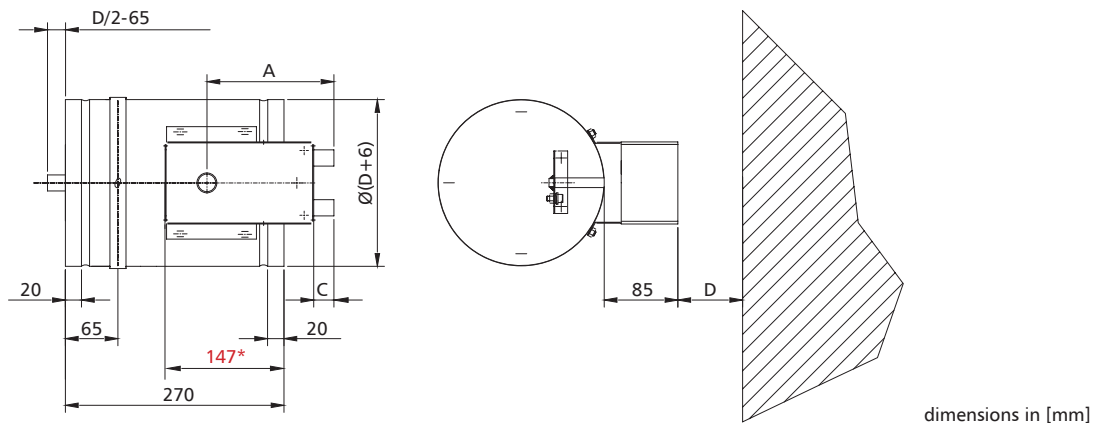
Spacing and number of openings according to EN 12220 (dimensions of circular flanges for general ventilation).

5.3.3 | mcr FID PRO – 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 fire damper blade remains open. In case of fire, the blade closes automatically or through the fire automation system in case of a damper with an electromagnetic trigger.

mcr FID PRO dampers are equipped with a KW1 trigger control mechanism with a drive spring and a cam-lever system. A 74°C thermal trigger (optionally 95°C) is integrated into the damper mechanism. Once the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. A mechanical blade position indicator is placed on the KW1 mechanism. 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. The mechanism features a test and blade button-release functions. Blade re-opening is activated manually using a key. It is not required to dismantle the system to replace the thermal trigger. The KW1 mechanism may be replaced with an electric actuator.

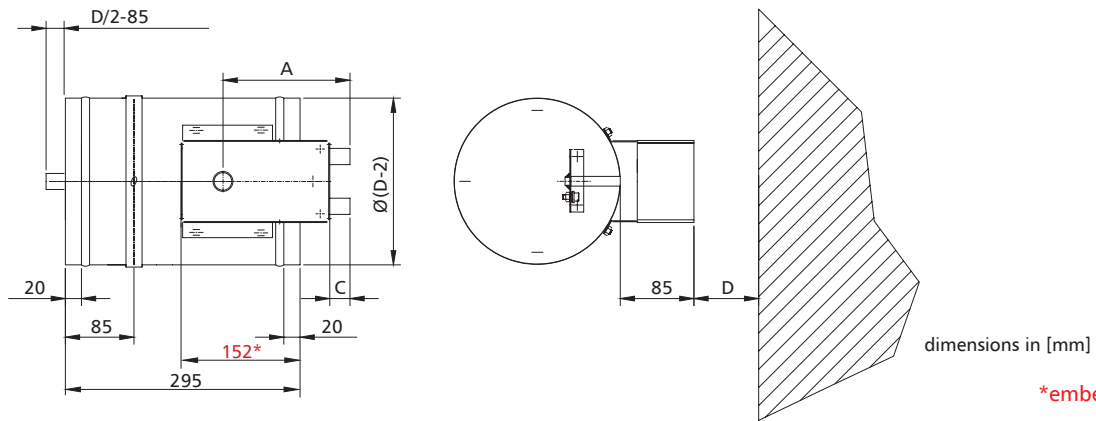
» muff version



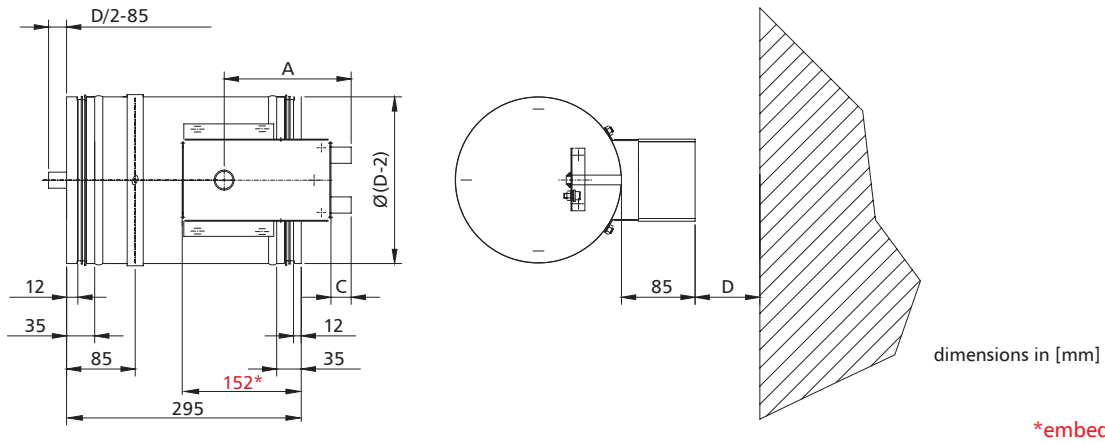
*embedding border

mcr FID PRO | Low-resistance circular single-blade cut-off fire dampers for comfort ventilation systems

» nipple version

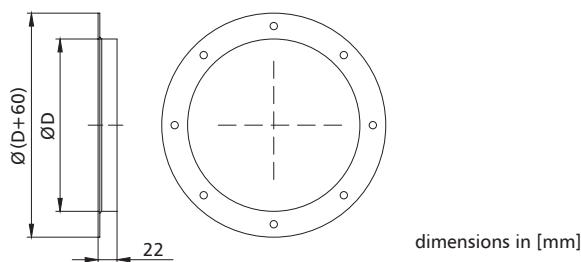


» version with UKW perimeter gasket



mechanism	A	C	D
KW1	130	30	75

» connection flange



Spacing and number of openings according to EN 12220 (dimensions of circular flanges for general ventilation).

5.4 | Dimensions

Circular dampers:

» nominal diameter D from 100 mm to 315 mm

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

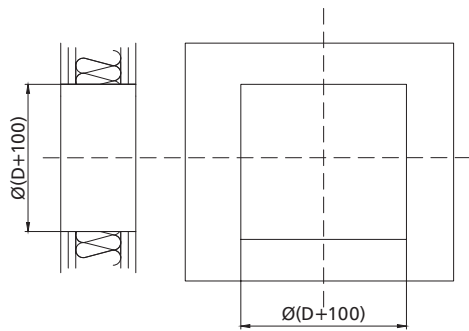
mcr FID PRO | Low-resistance circular single-blade cut-off fire dampers for comfort ventilation systems

5.5 | Installation

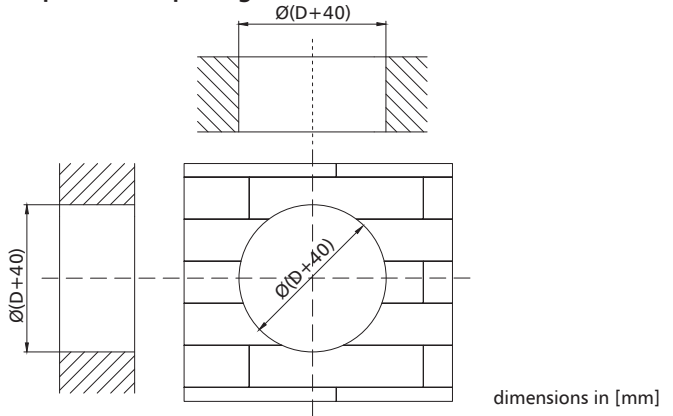
mcr FID PRO round dampers are rated EI120(v_e h_o $i \leftrightarrow o$)S and EI60(v_e h_o $i \leftrightarrow o$)S if installed in concrete partitions, partitions made of full bricks or aerated concrete blocks with a thickness of at least 125 mm, in light walls/shafts made of gypsum boards with a min. thickness of 125 mm and concrete floors with a min. thickness of 150 mm. Additionally, mcr FID PRO dampers with diameters from 201 to 315 mm installed in concrete floor slabs are EI180(h_o $i \leftrightarrow o$)S rated. Dampers may also be installed away from walls/shafts, provided that the ventilation duct section between the damper and the wall meets the criteria of EIS120 fire resistance rating.

5.5.1 | Preparation of installation openings

» in light gypsum board walls – dry installation (preferred opening)



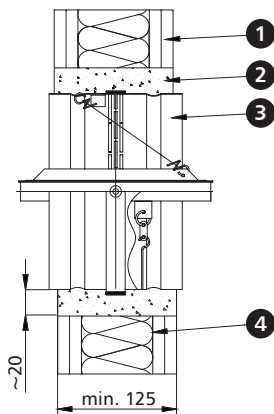
» in rigid walls and floor slabs - wet installation (preferred opening)



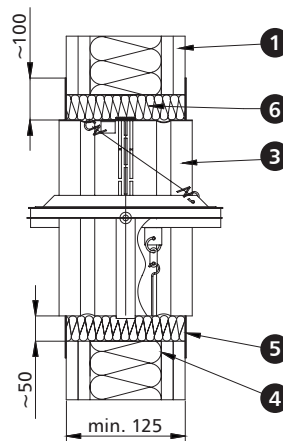
5.5.2 | Sample installation in gypsum board light walls

» mcr FID PRO damper with an RST mechanism

» WET installation



» DRY installation



1. light wall
2. sealing - masonry mortar*
3. mcr FID PRO fire damper

4. structural profile
5. elastic fire protection grout/mass*

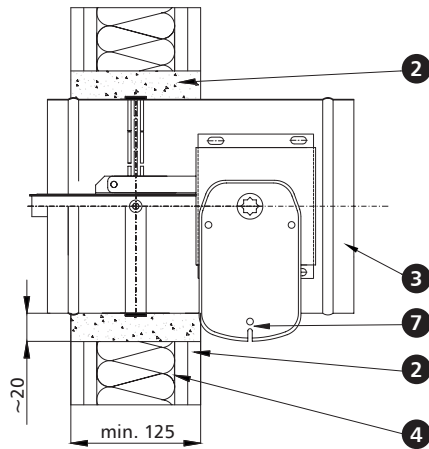
* Recommended damper installation in a dry system is based on wool with a min. density of 150 kg/m³ and a fire resistance class A1, as well as on securing the contact portion between the damper and the wall and the wall itself with the elastic fire protection mass mcr PolyIac Elastic with a thickness of 1 mm, as per the drawing above. Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 125 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.

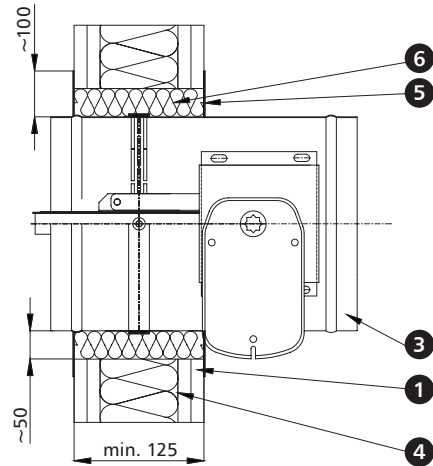
mcr FID PRO | Low-resistance circular single-blade cut-off fire dampers for comfort ventilation systems

» mcr FID PRO damper with a BFL, MLF, KW1 mechanism

» WET installation



» DRY installation



dimensions in [mm]

- | | | |
|------------------------------|--|------------------------------|
| 1. light wall | 4. structural profile | 6. mineral wool* |
| 2. sealing - masonry mortar* | 5. elastic fire protection grout/mass* | 7. trigger control mechanism |
| 3. mcr FID PRO fire damper | | |

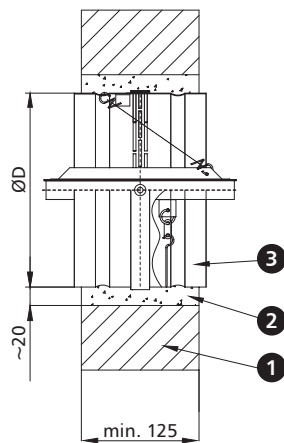
* Recommended damper installation in a dry system is based on wool with a min. density of 150 kg/m³ and a fire resistance class A1, as well as on securing the contact portion between the damper and the wall and the wall itself with the elastic fire protection mass mcr Polylac Elastic with a thickness of 1 mm, as per the drawing above. Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 125 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.

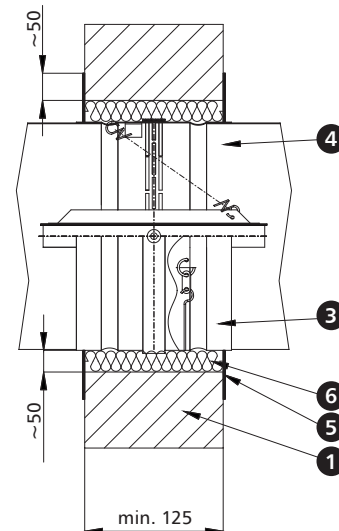
5.5.3 | Sample installation in concrete and brick walls

» mcr FID PRO damper with an RST mechanism

» WET installation



» DRY installation



dimensions in [mm]

- | | |
|------------------------------|--|
| 1. rigid wall | 4. ventilation duct |
| 2. sealing - masonry mortar* | 5. elastic fire protection grout/mass* |
| 3. mcr FID PRO fire damper | 6. mineral wool* |

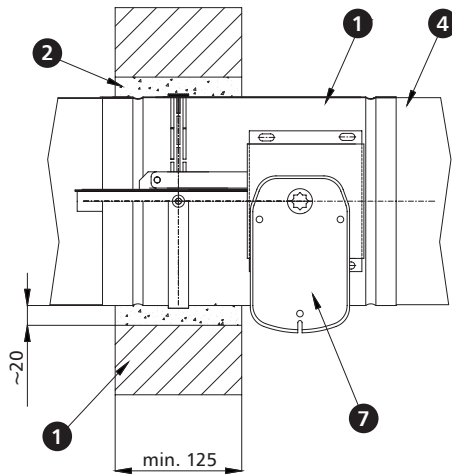
* Recommended damper installation in a dry system is based on wool with a min. density of 150 kg/m³ and a fire resistance class A1, as well as on securing the contact portion between the damper and the wall and the wall itself with the elastic fire protection mass mcr Polylac Elastic with a thickness of 1 mm, as per the drawing above. Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 125 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.

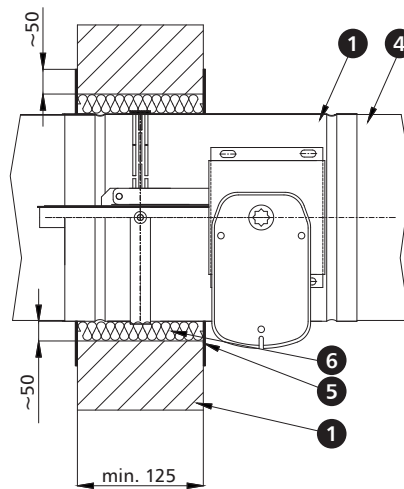
mcr FID PRO | Low-resistance circular single-blade cut-off fire dampers for comfort ventilation systems

» mcr FID PRO damper with a BFL, MLF, KW1 mechanism

» WET installation



» DRY installation



dimensions in [mm]

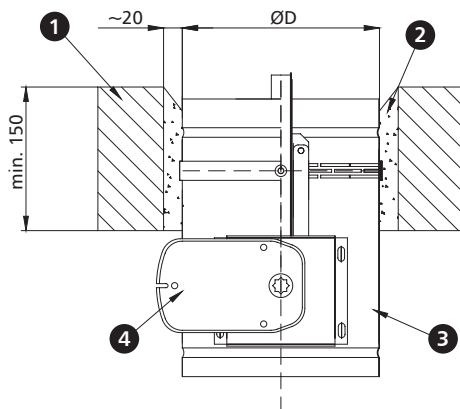
- | | | |
|------------------------------|--|------------------------------|
| 1. rigid wall | 4. ventilation duct | 6. mineral wool* |
| 2. sealing - masonry mortar* | 5. elastic fire protection grout/mass* | 7. trigger control mechanism |
| 3. mcr FID PRO fire damper | | |

* Recommended damper installation in a dry system is based on wool with a min. density of 150 kg/m³ and a fire resistance class A1, as well as on securing the contact portion between the damper and the wall and the wall itself with the elastic fire protection mass mcr Polylac Elastic with a thickness of 1 mm, as per the drawing above. Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

NOTE: If the damper is installed in a wall with a thickness of less than 125 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.

5.5.4 | Sample installation in floor slabs

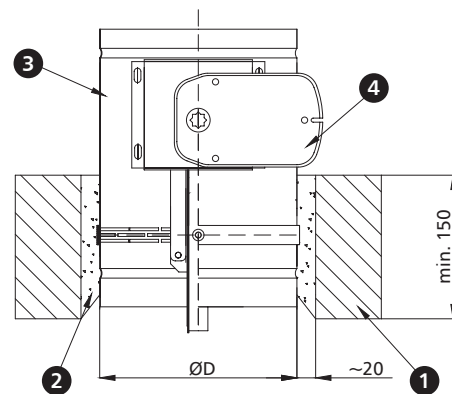
» mcr FID PRO damper
» with a BFL, MLF, KW1 mechanism



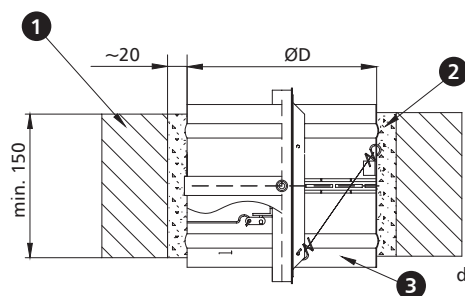
1. floor slab
2. sealing - concrete, cement or cement-lime masonry mortar*
3. mcr FID PRO fire damper
4. trigger control mechanism

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the method applied

» mcr FID PRO damper
» with a BFL, MLF, KW1 mechanism



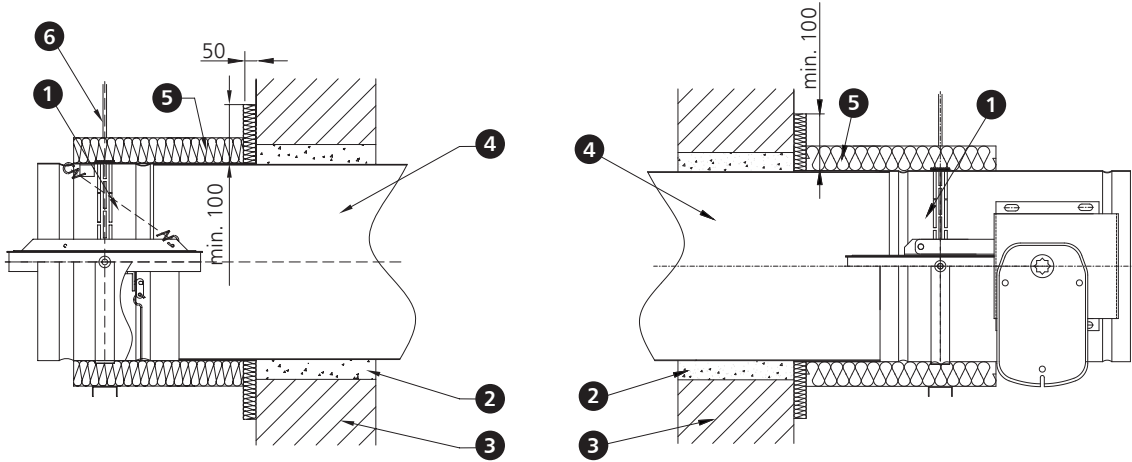
» mcr FID PRO damper with an RST mechanism



dimensions in [mm]

mcr FID PRO | Low-resistance circular single-blade cut-off fire dampers for comfort ventilation systems

5.5.5 | Sample installation outside of a fire partition

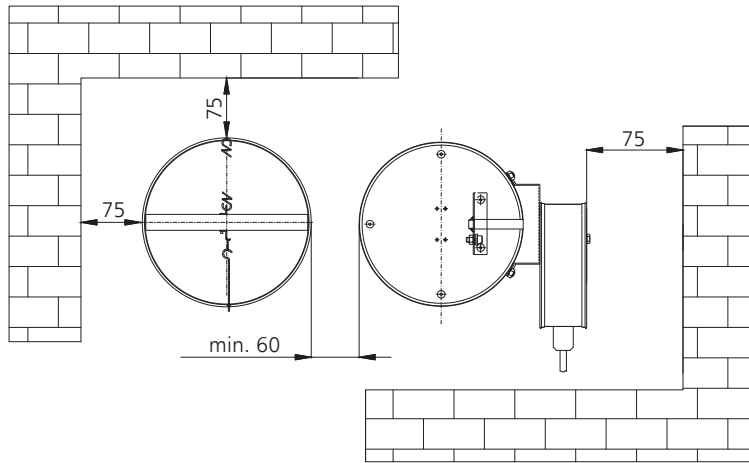


dimensions in [mm]

- 1. mcr FID PRO fire damper
- 2. e.g. cement mortar*
- 3. wall
- 4. ventilation duct
- 5. fire protection material ensuring the required fire resistance rating
- 6. duct suspension

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

Distance between systems and partitions



dimensions in [mm]

mcr FID PRO | Low-resistance circular single-blade cut-off fire dampers for comfort ventilation systems

5.6 | mcr FID PRO rectangular dampers technical parameters

D – nominal diameter [mm]

v – velocity [m/s]

Q – flow [m³/h]

S_k – duct cross-section [m²]

d_p – pressure drop [Pa]

S_e – damper active cross-section [m²]

L_{WA} – damper noise level [dB]

» mcr FID PRO EIS 60

» mcr FID PRO 100

D [m/s]	v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
100	2	0.0079	0.0064	46	3	16
	4			91	11	25
	6			137	20	33
	8			183	32	40

» mcr FID PRO 125

D [m/s]	v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
125	2	0.0123	0.0104	75	2	14
	4			150	8	23
	6			224	15	32
	8			299	25	39

» mcr FID PRO 160

D [m/s]	v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
160	2	0.0201	0.0177	127	1	11
	4			255	3	14
	6			382	7	24
	8			510	12	32

» mcr FID PRO 200

D [m/s]	v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
200	2	0.0314	0.0284	204	1	12
	4			409	3	17
	6			613	8	29
	8			818	15	37

» mcr FID PRO 250

D [m/s]	v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
250	2	0.0491	0.0453	326	1	3
	4			653	2	8
	6			979	2	15
	8			1305	4	20

» mcr FID PRO 315

D [m/s]	v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
315	2	0.0779	0.0732	527	1	4
	4			1054	2	10
	6			1580	3	18
	8			2107	5	26

mcr FID PRO | Low-resistance circular single-blade cut-off fire dampers for comfort ventilation systems

D – nominal diameter [mm]

v – velocity [m/s]

Q – flow [m³/h]

S_k – duct cross-section [m²]

d_p – pressure drop [Pa]

S_e – damper active cross-section [m²]

L_{WA} – damper noise level [dB]

» mcr FID PRO EIS 120

» mcr FID PRO 100

D [m/s]	v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
100	2	0.0079	0.0059	42	4.5	21
	4			84	14	29
	6			126	26	37
	8			168	42	43

» mcr FID PRO 125

D [m/s]	v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
125	2	0.0123	0.0098	70	3	19
	4			141	10	27
	6			211	20	36
	8			281	33	42

» mcr FID PRO 160

D [m/s]	v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
160	2	0.0201	0.0169	122	1	16
	4			243	4	17
	6			365	9	28
	8			487	16	35

» mcr FID PRO 200

D [m/s]	v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
200	2	0.0314	0.0274	197	1	16
	4			395	5	21
	6			592	11	33
	8			789	20	40

» mcr FID PRO 250

D [m/s]	v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
250	2	0.0491	0.0391	281	2	17
	4			563	4	21
	6			844	7	27
	8			1125	10	33

» mcr FID PRO 315

D [m/s]	v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
315	2	0.0779	0.0653	470	2	18
	4			940	4	23
	6			1410	7	31
	8			1880	13	39

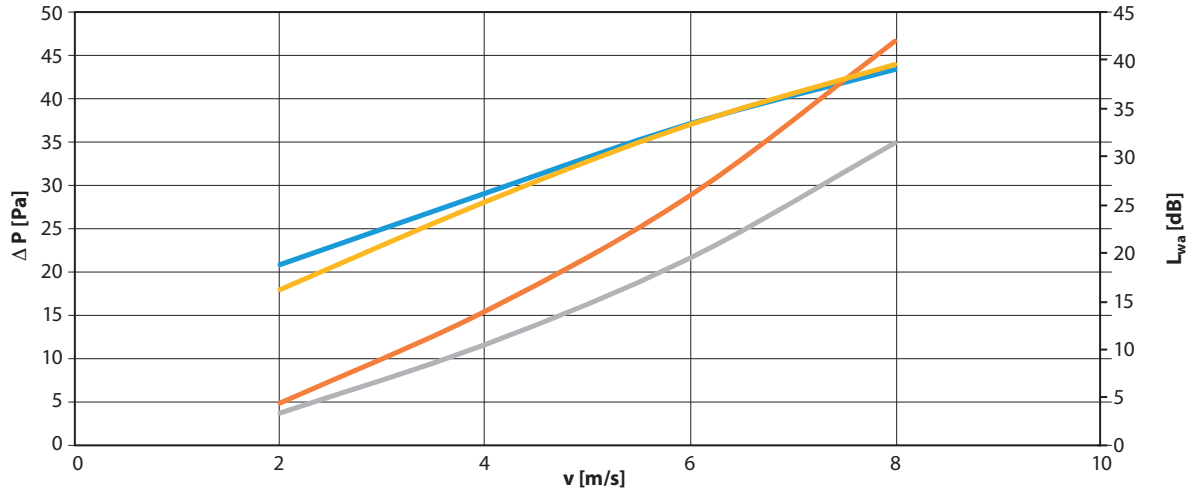
The mcr FID PRO fire damper selection program is available at www.mercor.com.pl, in the Designer Zone.

mcr FID PRO | Low-resistance circular single-blade cut-off fire dampers for comfort ventilation systems

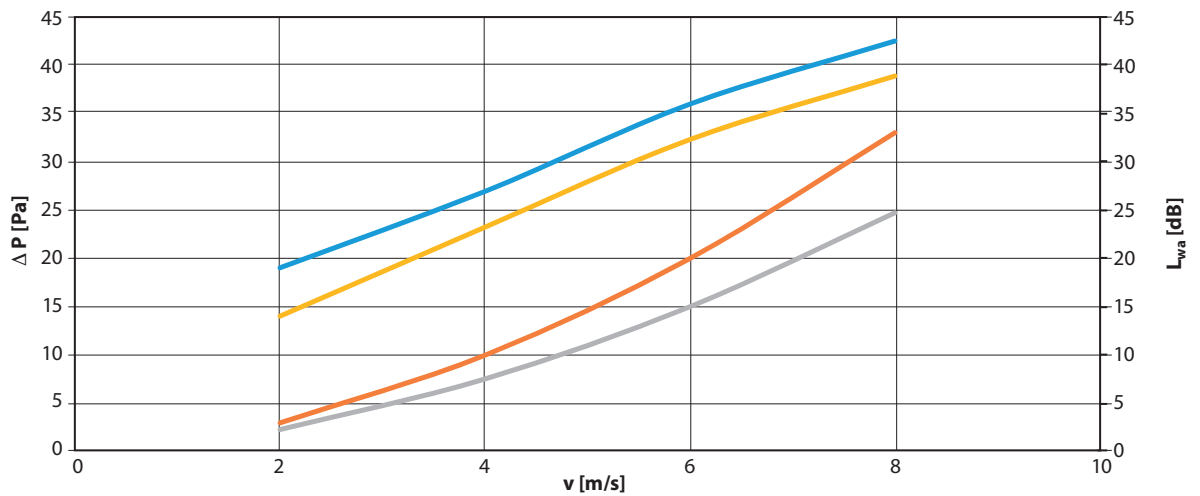
5.6.1 | Flow characteristics for mcr FID PRO circular dampers



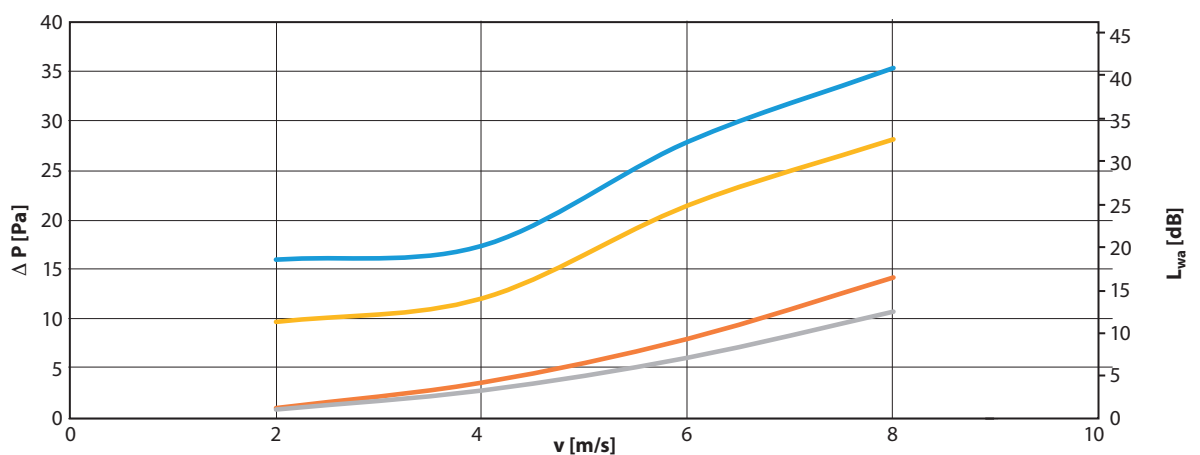
» mcr FID PRO 100



» mcr FID PRO 125



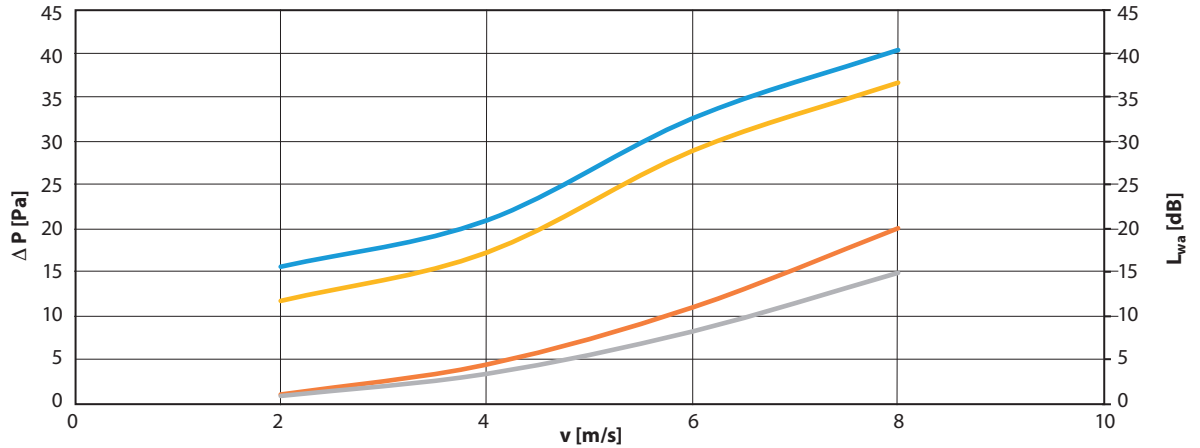
» mcr FID PRO 160



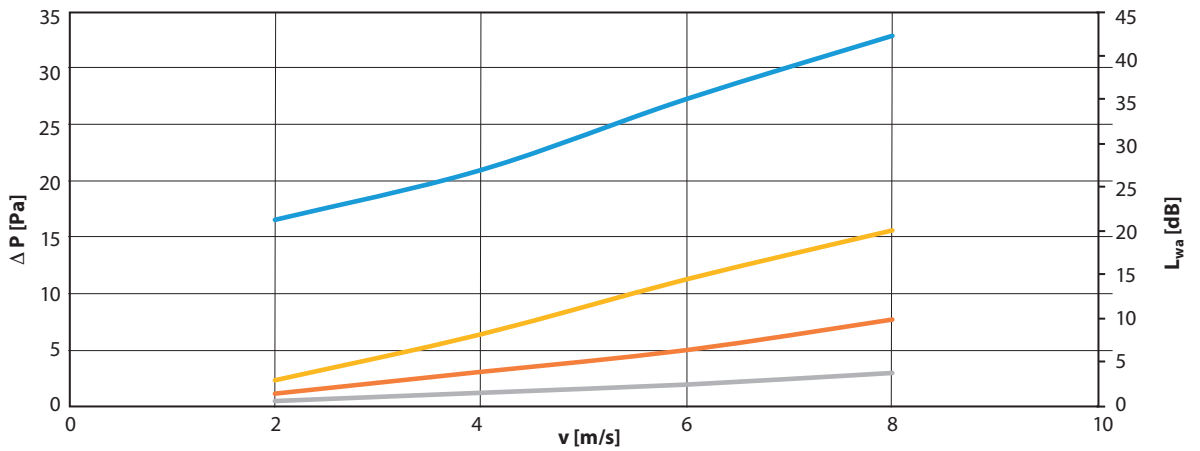
mcr FID PRO | Low-resistance circular single-blade cut-off fire dampers for comfort ventilation systems

EIS120 damper noise emission level
 EIS120 pressure drop on a damper
 EIS60 pressure drop on a damper
 EIS60 damper noise emission level

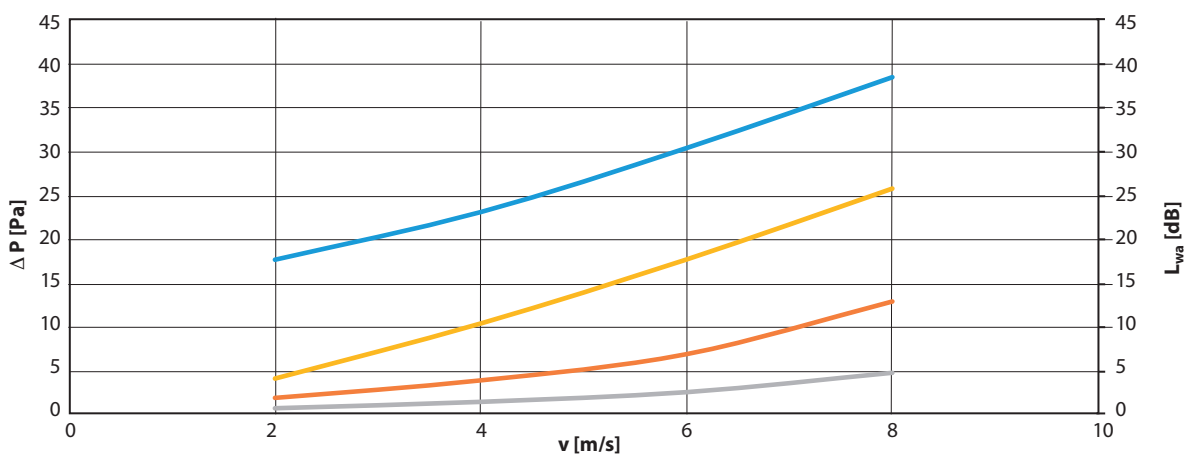
» mcr FID PRO 200



» mcr FID PRO 250



» mcr FID PRO 315



mcr FID PRO | Low-resistance circular single-blade cut-off fire dampers for comfort ventilation systems

5.7 | Estimated weights of mcr FID PRO dampers for circular ventilation ducts [kg]

diameter D [mm]	RST	actuator/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

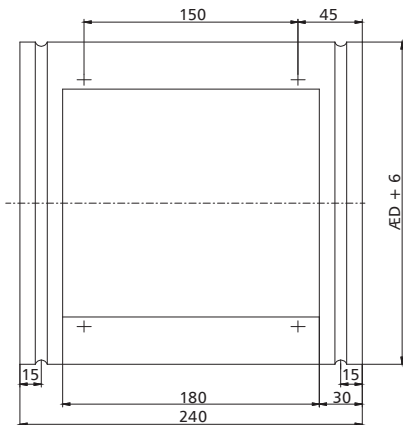
5.8 | Accessories

5.8.1 | Casing module with KRW-type inspection access

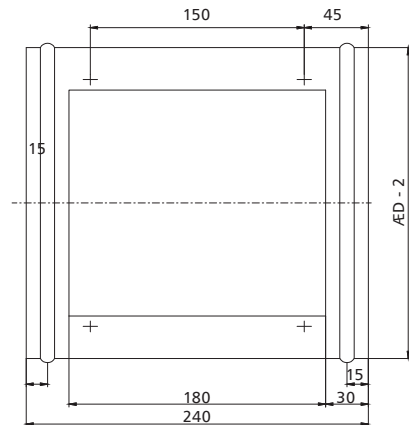
The casing modules with a KRW-type inspection access are made of sheet metal and equipped with connection flanges. The casing features an inspection access opening with a cover. The module enables to access the damper blade or a drive train quickly without having to dismantle the damper or the duct on which it is installed.

Versions:

- » KRW OM module
- » round muff module for nipple damper



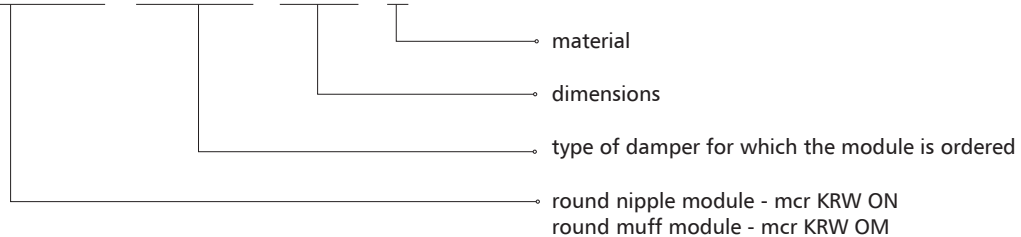
- » KRW ON module
- » round nipple module for muff damper



dimensions in [mm]

Marking

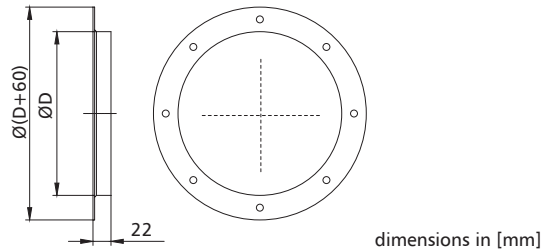
mcr KRW ON / FID PRO / B x H / X



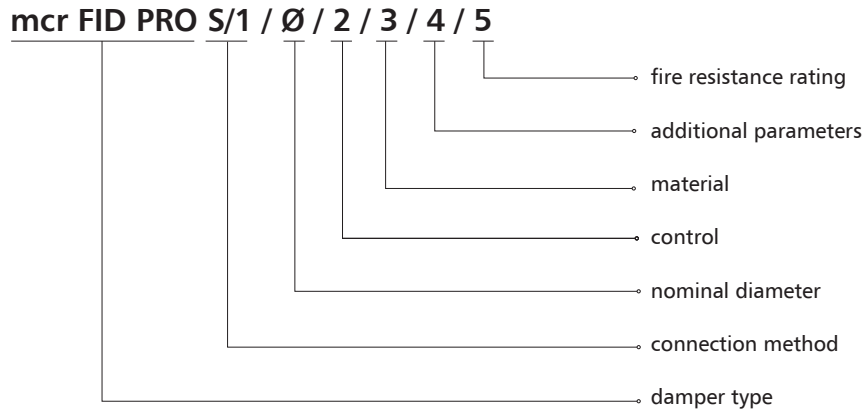
X – material
 [no symbol] – galvanized steel, Zn 275 g/m² coating
 KN – stainless steel
 KK – 1.4404 acid-proof steel

5.8.2 | Connection flange

The connection flange is used to connect a round fire damper to a duct with a connection made in accordance with PN-EN 12220.



5.9 | Marking



1 - connection method

- N or [no symbol] – nipple
- M – muff
- K – flange

2 - control:

- » **RST trigger control mechanism**
 - RST – thermal trigger
 - RST/WK1 – thermal trigger + “pulse” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
 - RST/WK2 – thermal trigger + “break” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade)
- » **RST trigger control mechanism-KW1**
 - KW1/S – thermal trigger
 - KW1/S/WK2 – thermal trigger + limit switch (open/closed blade signal)
 - KW1/24I/WK2 – thermal trigger + “pulse” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
 - KW1/24P/WK2 – thermal trigger + “break” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade) signal)
 - KW1/24I/WK2(+MP230/24) – thermal trigger + “pulse” electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
 - KW1/24P/WK2(+MP230/24) – thermal trigger + “break” electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
- » **trigger and control mechanism, axial actuator**
 - BF24TL-TN-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-SR-T – actuator with a return spring, U = 24 V AC/DC
 - BFL230-T – actuator with a return spring, U = 230 V AC
 - BFL24-TN-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
 - MLF24T – actuator with a return spring, U = 24 V AC/DC
 - MLF230T – actuator with a return spring, U = 230 V AC

mcr FID PRO | Low-resistance circular single-blade cut-off fire dampers for comfort ventilation systems

3 - material

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

4 - additional parameters

» Thermoelectric and thermal triggers

- [no symbol] – 72°C trigger
- ZBAT95 – thermoelectric trigger for 95°C
- T93-95 – thermal trigger for 95°C
- T2-95 (MLF) – thermal trigger for 95°C

» Control mechanism position

- [no symbol] – perpendicular to the damper rotation axis*
- WOK – along the damper axis

» Extended damper casing

- [no symbol] – standard casing length
- 400 – casing with a length of 400 mm

» Extended damper casing

- [no symbol] – design without gaskets
- UKW – version with external gaskets

5 - fire resistance rating

- [no symbol] – fire resistance rating EI120
- EI60 – fire resistance rating EI60

* – for dampers with the KW1 mechanism, the trigger control mechanism is installed along the axis of rotation as standard – exception

NOTE: separate additional parameters entered with the “/” sign

example marking:

mcr FID PRO Ø125 BFL24-T

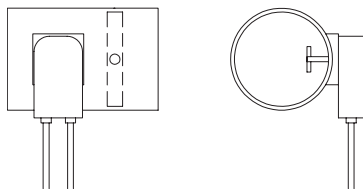
EI120 low-resistance cut-off damper with a 24 V actuator with a thermoelectric trigger and limit switches.

mcr FID PRO Ø125 RST/WK1

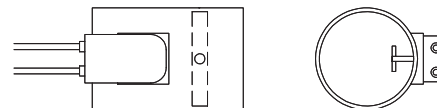
EI120 low-resistance cut-off damper with a 74°C thermal trigger and damper blade opening limit switch.

5.9.1 | Design standard

» right damper - standard



» actuator along the damper axis



standard for BFL24-TN-ST

Chapter 16 - power supply and control (p. 262) contains the following information:
- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper.



downloadable models
on the website
under the designer zone tab



- » **EIS120**
- » Fire resistance class: EI120 ($v_e h_o i \leftrightarrow o$)S, EI60 ($v_e h_o i \leftrightarrow o$)S.
- » Certificate of constancy of performance 1812-CPR-1916, 1812-CPR-1917, 1812-CPR-1918, 1812-CPR-1919.
- » Dampers certified for compliance with EN 15650.
- » Dampers qualified under EN 13501-3 and tested under EN 1366-2.
- » Cut-off dampers resistance independent of airflow direction and installation side.
- » Certified installation in ductwork or with anemostat at system termination.

6.1 | Application

mcr FID WING cut-off dampers are designed for installation in general ventilation systems at installation passages through vertical and horizontal construction partitions. During a fire, they preserve the fire resistance rating of the construction partition that the ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and fire gasses 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, unless included in a special, individually developed service and technical inspections programme.

6.2 | Design



mcr FID WING cut-off fire dampers consist of a casing with a circular cross-section, a moving damper blade and a trigger and control mechanism, which is activated when the thermal trigger is tripped. The damper casing is made of galvanized steel sheets. There is an intumescent gasket and ventilation gasket on its outer part. The damper blade is made of a fireproof material.

mcr FID WING fire dampers remain open during normal operation. Dampers are switched over into safety state (closed) automatically when the thermal trigger (RST-type actuation and control mechanism) trips.

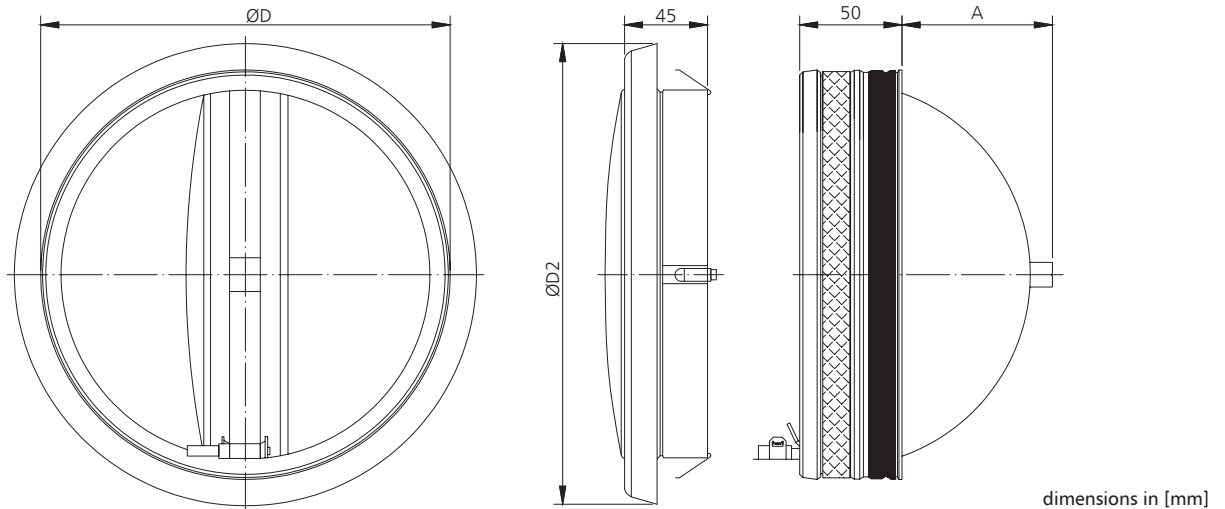
Fire dampers may be equipped with an adjustable air anemostat, the performance (active surface area) of which is adjusted by turning its disc. Anemostats are supplied in RAL 9010.

6.3 | Versions

During normal operation, the fire damper blade remains open. In case of fire, the blade closes automatically. mcr FID WING fire dampers are equipped with an RST trigger and control mechanism with a 74°C thermal trigger (it is possible to use a thermal trigger with the nominal tripping temperature of 95°C as an option) and driving spring. Once 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.

6.4 | Dimensions

» circular dampers:

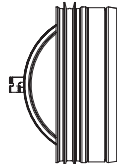


nominal diameter ØD [mm]	anemostat external diameter ØD2 [mm]	length A [mm]	weight [kg]
100	149	21	0,2
125	169	34	0,3
160	195	51	0,4
200	240	72	0,6

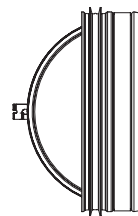
» mcr FID WING
Ø100



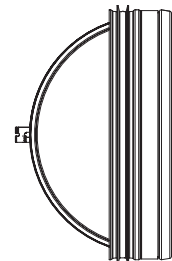
» mcr FID WING
Ø125



» mcr FID WING
Ø160



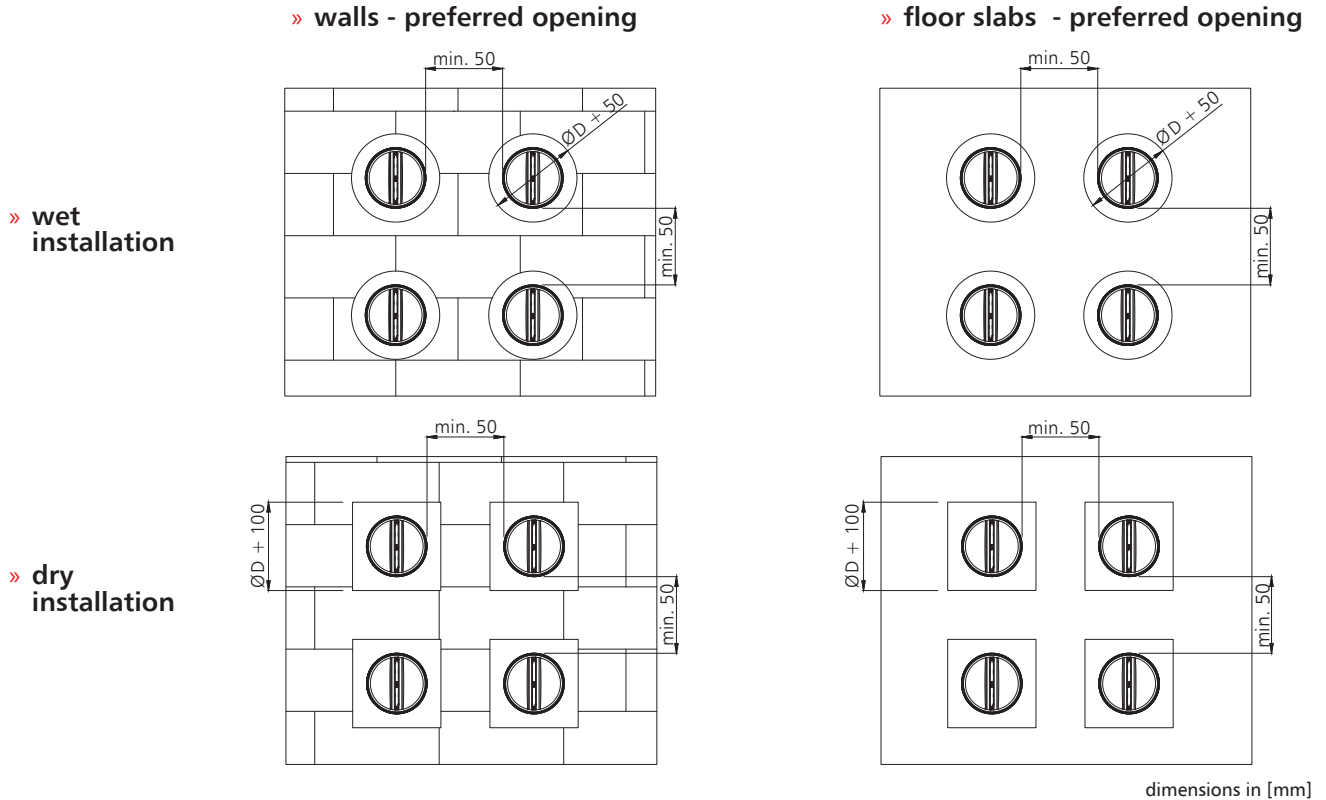
» mcr FID WING
Ø200



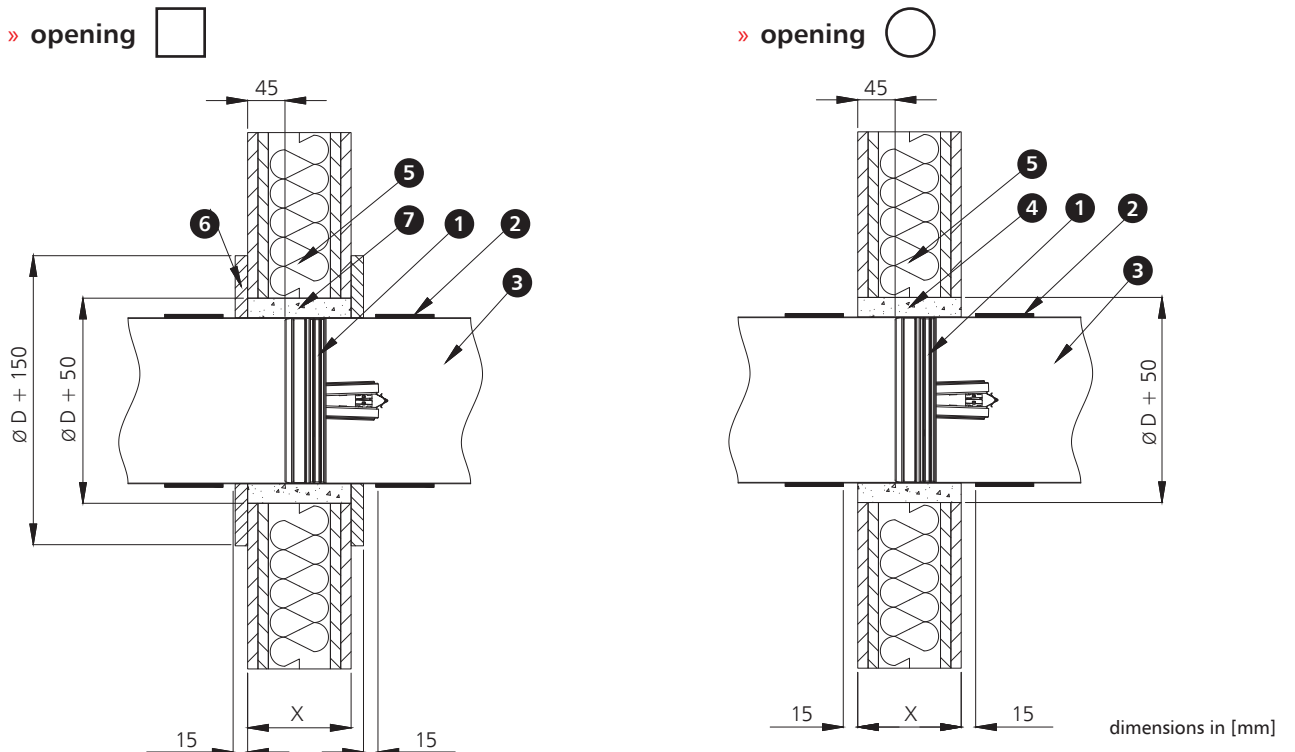
6.5 | Installation

mcr FID WING circular dampers are rated EI 120 ($v_e h_o i \leftrightarrow o$) S and EI 60 ($v_e h_o i \leftrightarrow o$) S if installed in concrete, solid brickwork or aerated concrete blockwork partitions with min. thickness of 100 mm, in light walls made of gypsum boards on a steel framework with a min. thickness of 100 mm and a fire resistance rating equal to the expected fire resistance rating of the fire damper in question and in concrete floor slabs with a min. thickness of 100 mm for EIS60 and 150 mm for EIS120.

6.5.1 | Preparation of installation openings



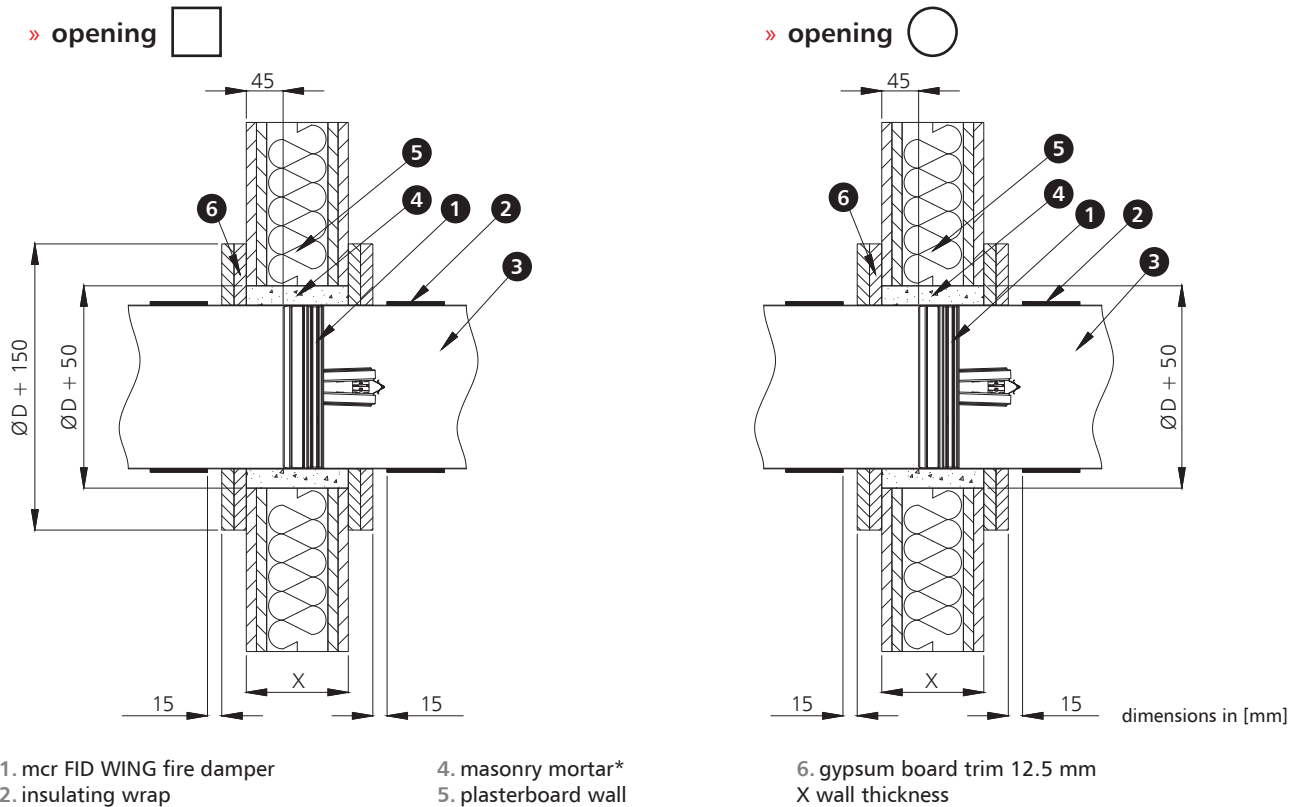
6.5.2 | mcr FID WING damper installation in plasterboard walls for EI60



- | | | |
|-----------------------------|------------------------------|-------------------------------------|
| 1. mcr FID WING fire damper | 4. masonry mortar* | 7. masonry mortar or mineral wool * |
| 2. insulating wrap | 5. plasterboard wall | X wall thickness |
| 3. ventilation duct | 6. gypsum board trim 12.5 mm | |

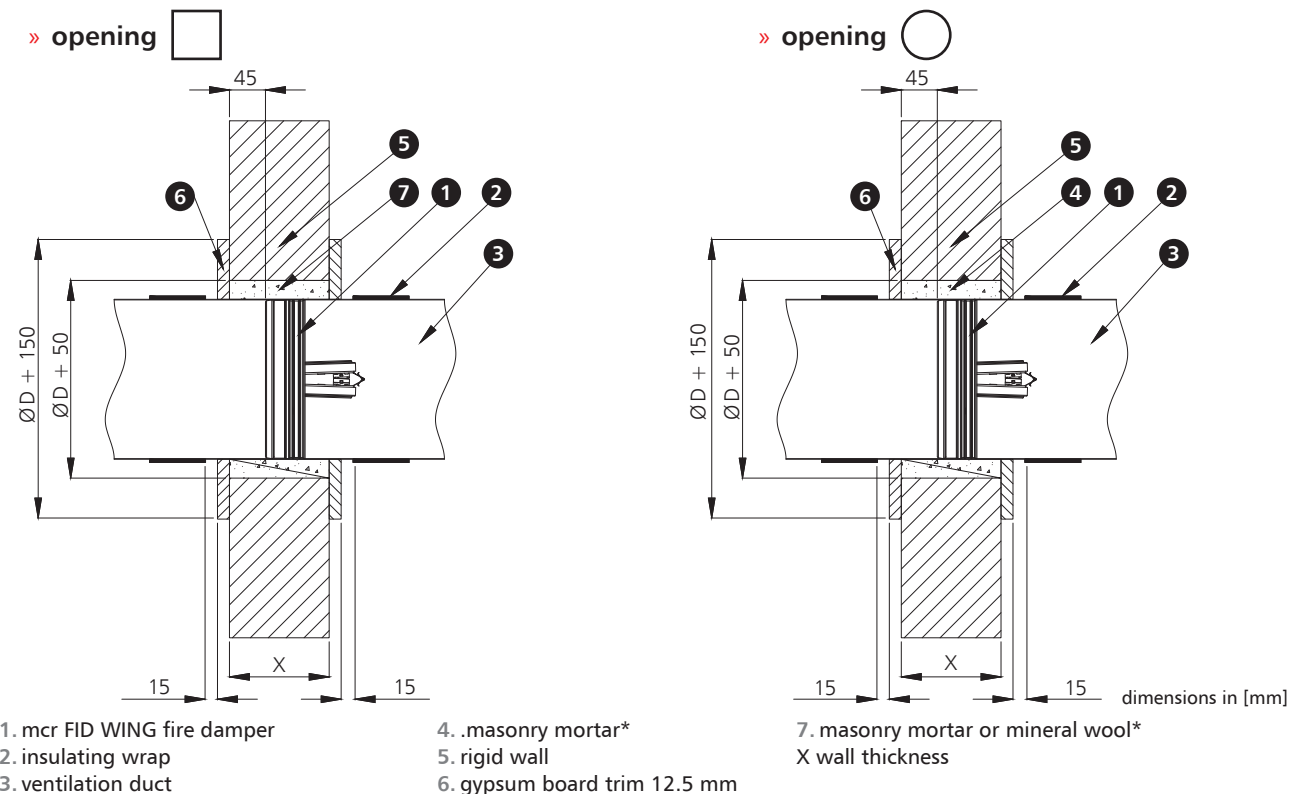
* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

6.5.3 | mcr FID WING damper installation in plasterboard walls for EI60



* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

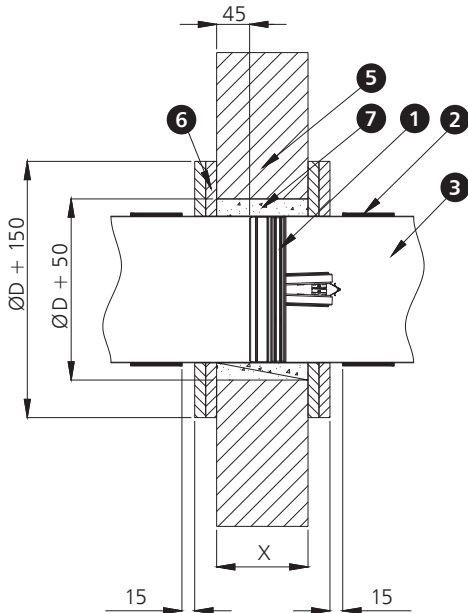
6.5.4 | mcr FID WING damper installation in rigid walls for EI60



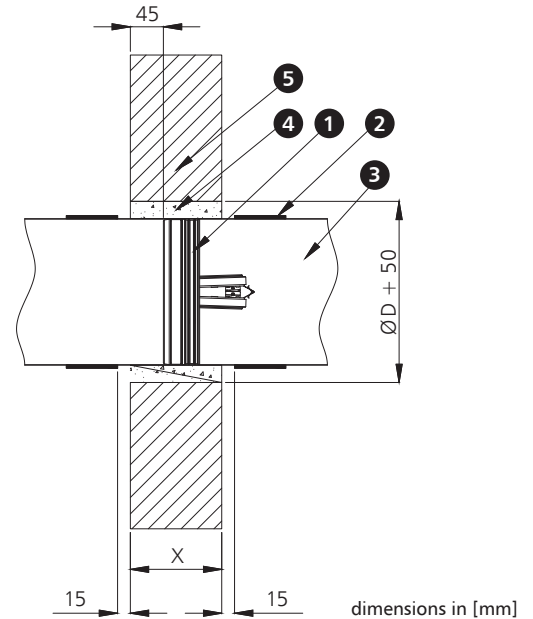
* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

6.5.5 | mcr FID WING damper installation in rigid walls for EIS120

» opening 



» opening 

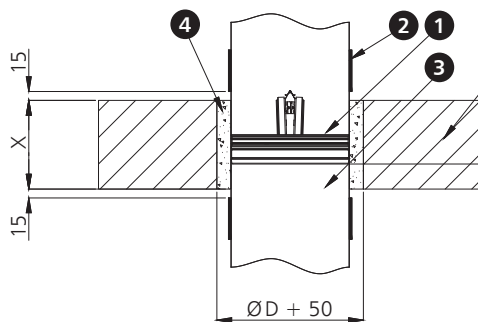


- | | | |
|-----------------------------|------------------------------|--|
| 1. mcr FID WING fire damper | 4. masonry mortar* | 7. masonry mortar or mineral wool* X wall thickness* |
| 2. insulating wrap | 5. rigid wall | X wall thickness |
| 3. ventilation duct | 6. gypsum board trim 12.5 mm | |

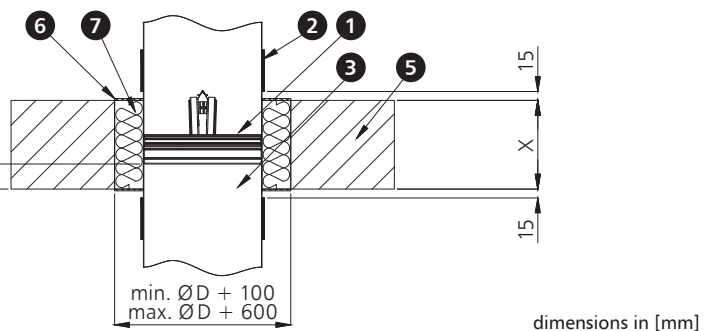
* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

6.5.6 | mcr FID WING damper installation in floor slabs

» opening 



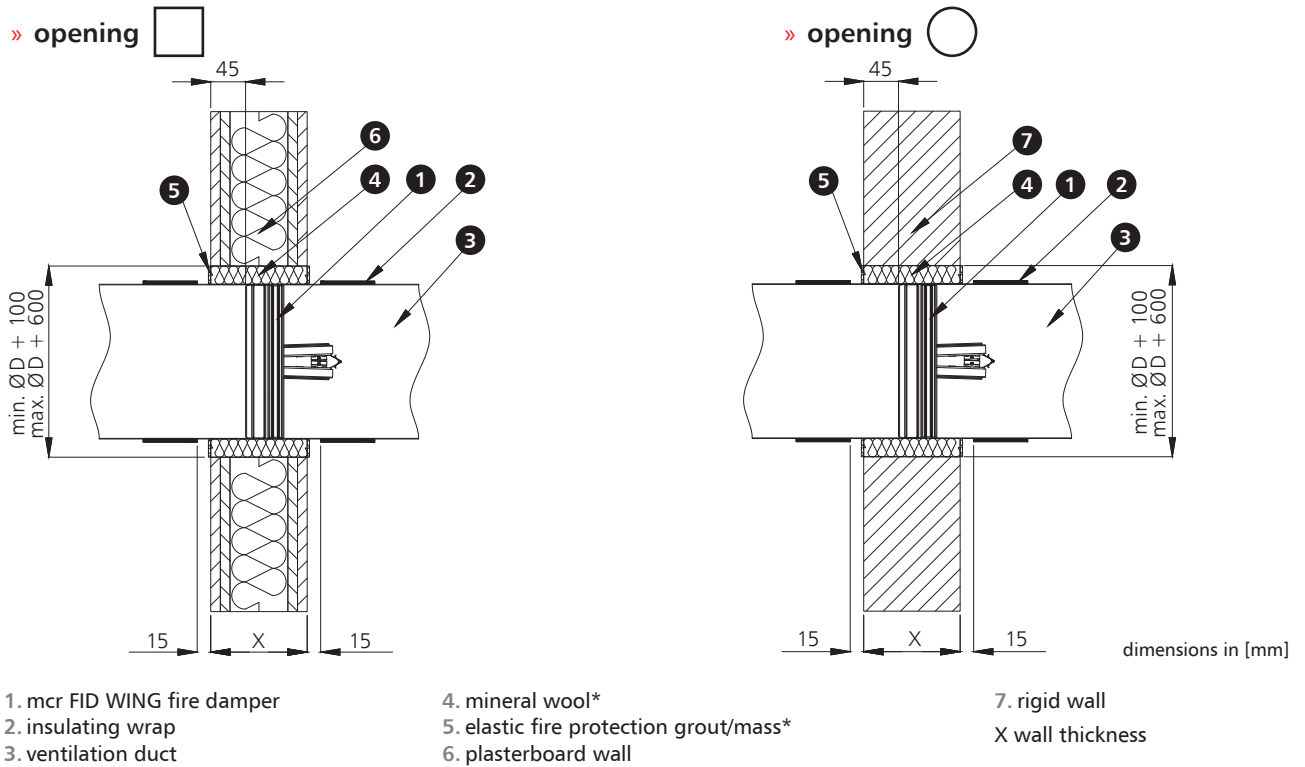
» opening 



- | | | |
|-----------------------------|--|-------------------------------------|
| 1. mcr FID WING fire damper | 4. masonry mortar* | 7. ..mineral wool* |
| 2. insulating wrap | 5. floor slab | X wall thickness |
| 3. ventilation duct | 6. elastic fire protection grout/mass* | Y 75 mm for EIS120, 45 mm for EIS60 |

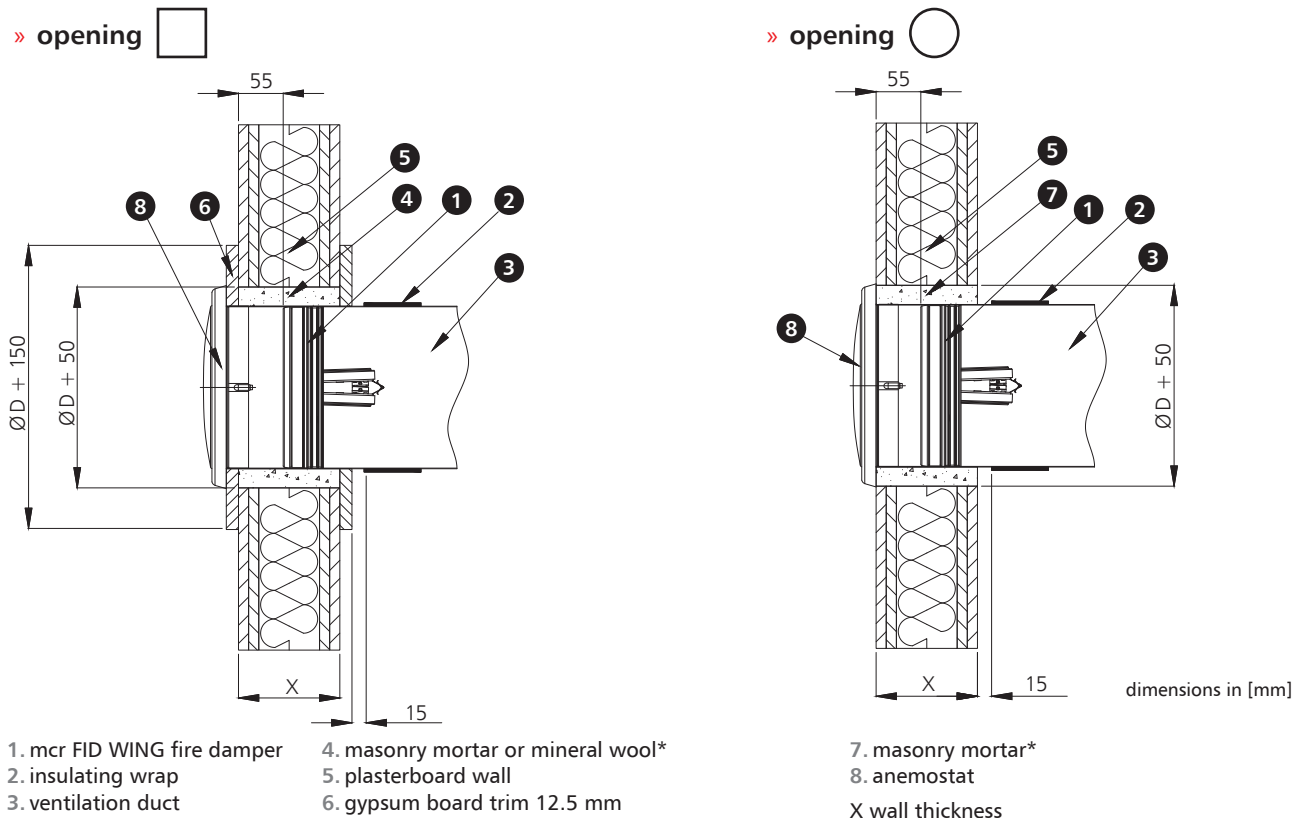
* Recommended damper installation in a dry system is based on wool with a min. density of 140 kg/m³ and fire resistance class A1 and a thickness of at least 50 mm, as well as on securing the contact portion between the wool and the wall with PROMASTOP E PASTE or HILTI CFS-CT elastic mass and wool with the PROMASTOP E PASTE or HILTI CFS-S ACR fire protection elastic mass, as per the drawing above. Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

6.5.7 | mcr FID WING damper installation in dry systems



* Recommended damper installation in a dry system is based on wool with a min. density of 140 kg/m³ and fire resistance class A1 and a thickness of at least 50 mm, as well as on securing the contact portion between the wool and the wall with PROMASTOP E PASTE or HILTI CFS-CT elastic mass and wool with the PROMASTOP E PASTE or HILTI CFS-S ACR fire protection elastic mass, as per the drawing above.
The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

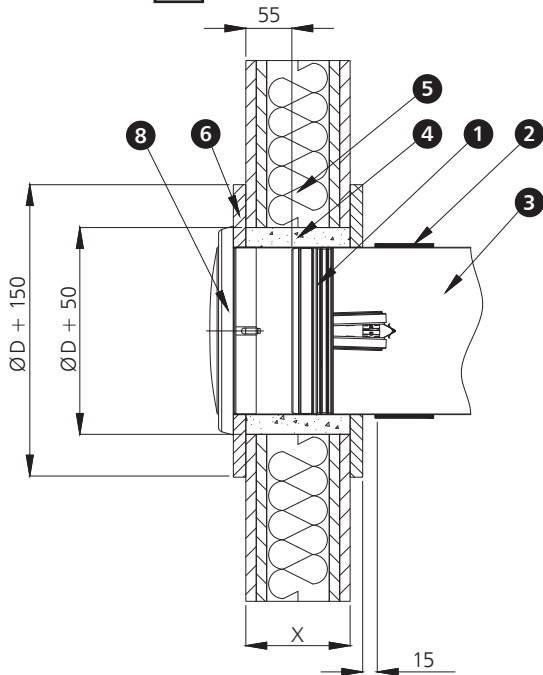
6.5.8 | mcr FID WING damper installation in plasterboard walls for EIS60



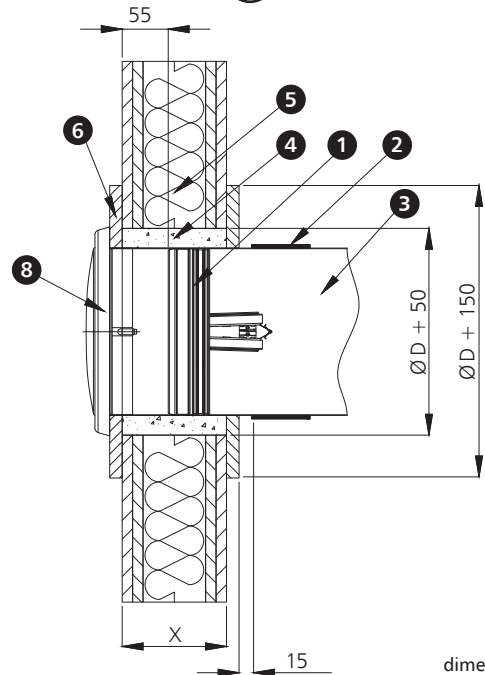
* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

6.5.9 | mcr FID WING damper installation in plasterboard walls for EIS120

» opening 



» opening 



- 1. mcr FID WING fire damper
- 2. insulating wrap
- 3. ventilation duct
- 4. masonry mortar or mineral wool*
- 5. plasterboard wall
- 6. gypsum board trim 12.5 mm

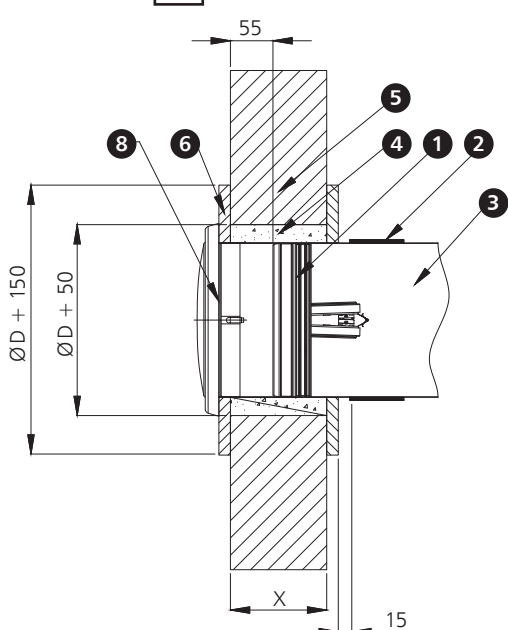
- 7. anemostat
- X wall thickness

dimensions in [mm]

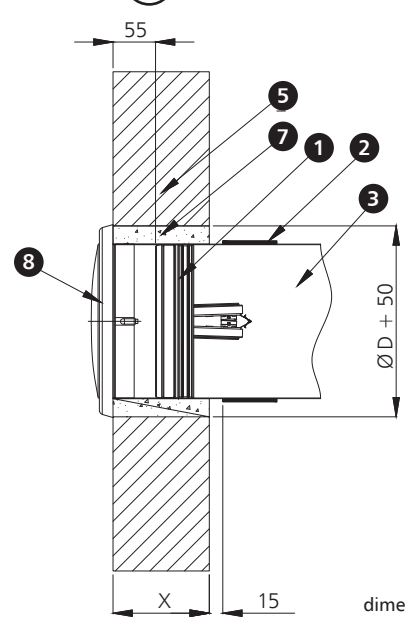
* Recommended damper installation in a dry system is based on wool with a min. density of 40 kg/m³ and fire resistance class A1, as well as on securing the contact portion of the damper. Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

6.5.10 | mcr FID WING damper installation in rigid walls for EIS120 and EIS60

» opening 



» opening 



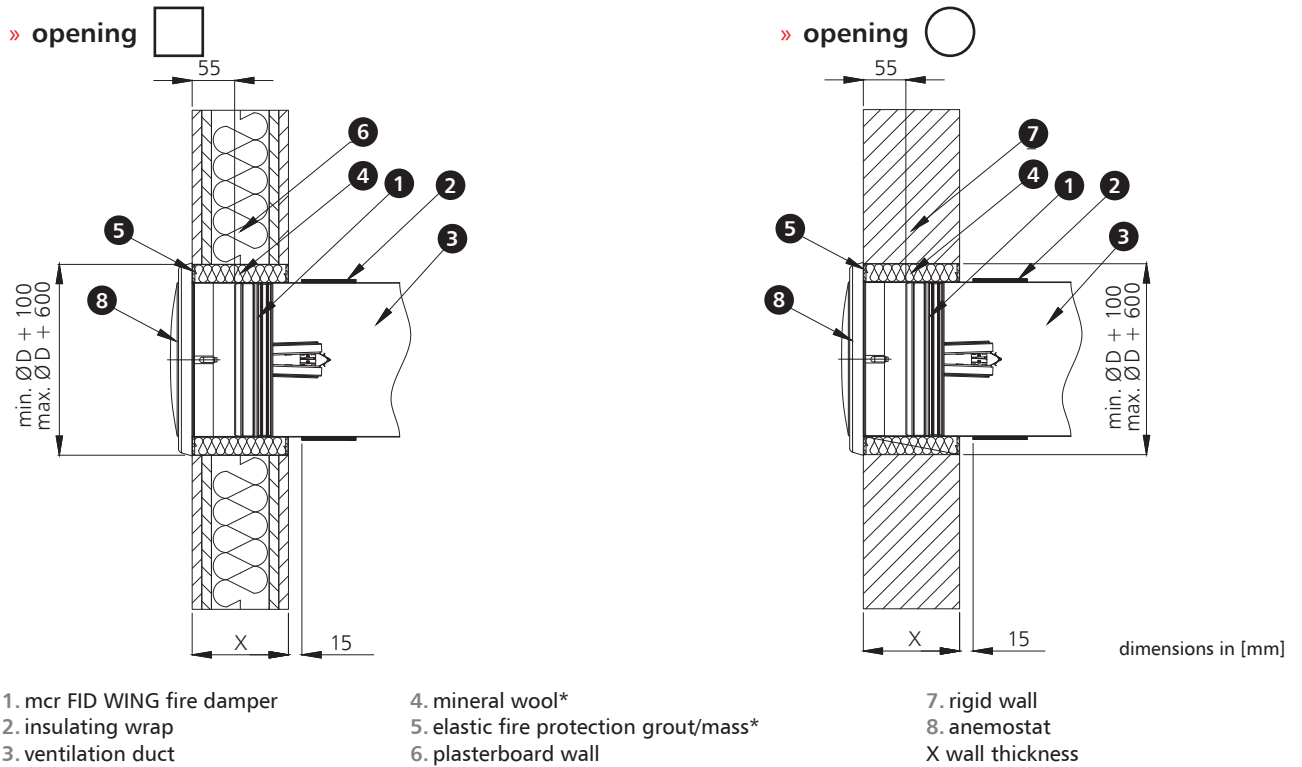
- 1. mcr FID WING fire damper
- 2. insulating wrap
- 3. ventilation duct
- 4. masonry mortar or mineral wool*
- 5. rigid wall
- 6. gypsum board trim 12.5 mm

- 7. masonry mortar*
- 8. anemostat
- X wall thickness

dimensions in [mm]

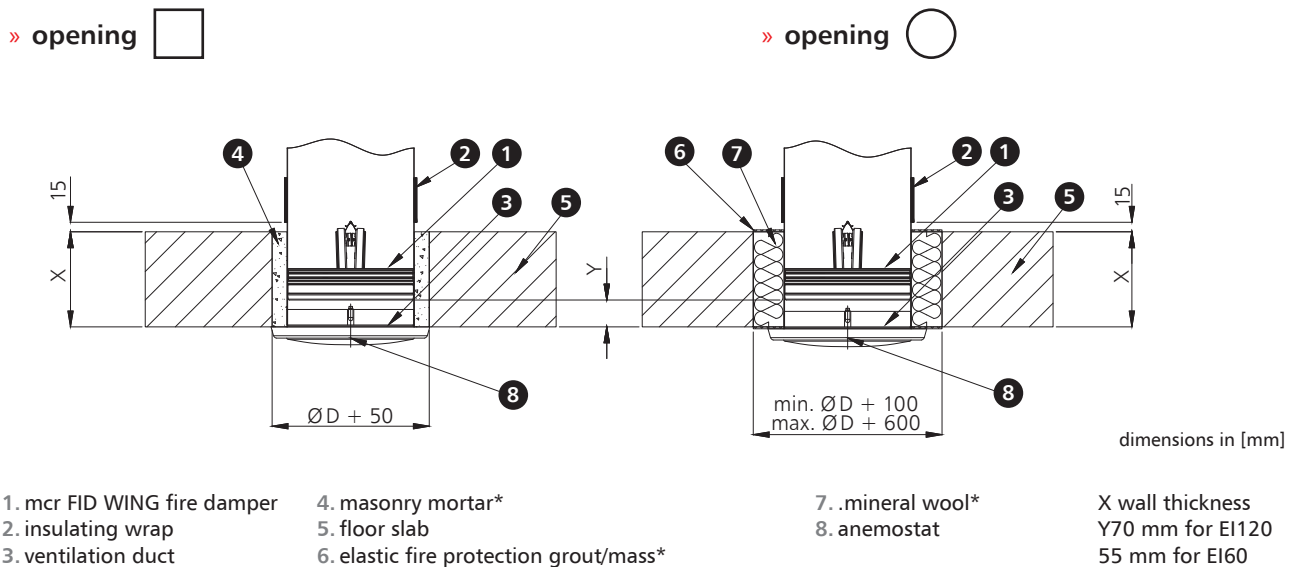
* Recommended damper installation in a dry system is based on wool with a min. density of 40 kg/m³ and fire resistance class A1, as well as on securing the contact portion of the damper. Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement.

6.5.11 | mcr FID WING damper installation in dry systems



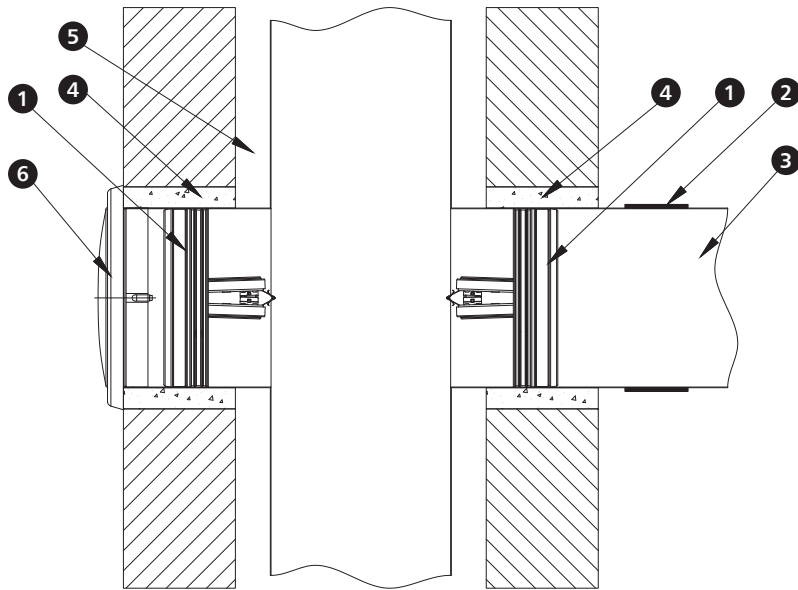
* Recommended damper installation in a dry system is based on wool with a min. density of 140 kg/m³ and fire resistance class A1 and a thickness of at least 50 mm, as well as on securing the contact portion between the wool and the wall with PROMASTOP E PASTE or HILTI CFS-CT elastic mass and wool with the PROMASTOP E PASTE or HILTI CFS-S ACR fire protection elastic mass, as per the drawing above. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

6.5.12 | mcr FID WING damper installation in floor slabs



* Recommended damper installation in a dry system is based on wool with a min. density of 140 kg/m³ and fire resistance class A1 and a thickness of at least 50 mm, as well as on securing the contact portion between the wool and the wall with PROMASTOP E PASTE or HILTI CFS-CT elastic mass and wool with the PROMASTOP E PASTE or HILTI CFS-S ACR fire protection elastic mass, as per the drawing above. Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

6.5.13 | mcr FID WING damper installation in service shaft openings for EIS120 and EIS60



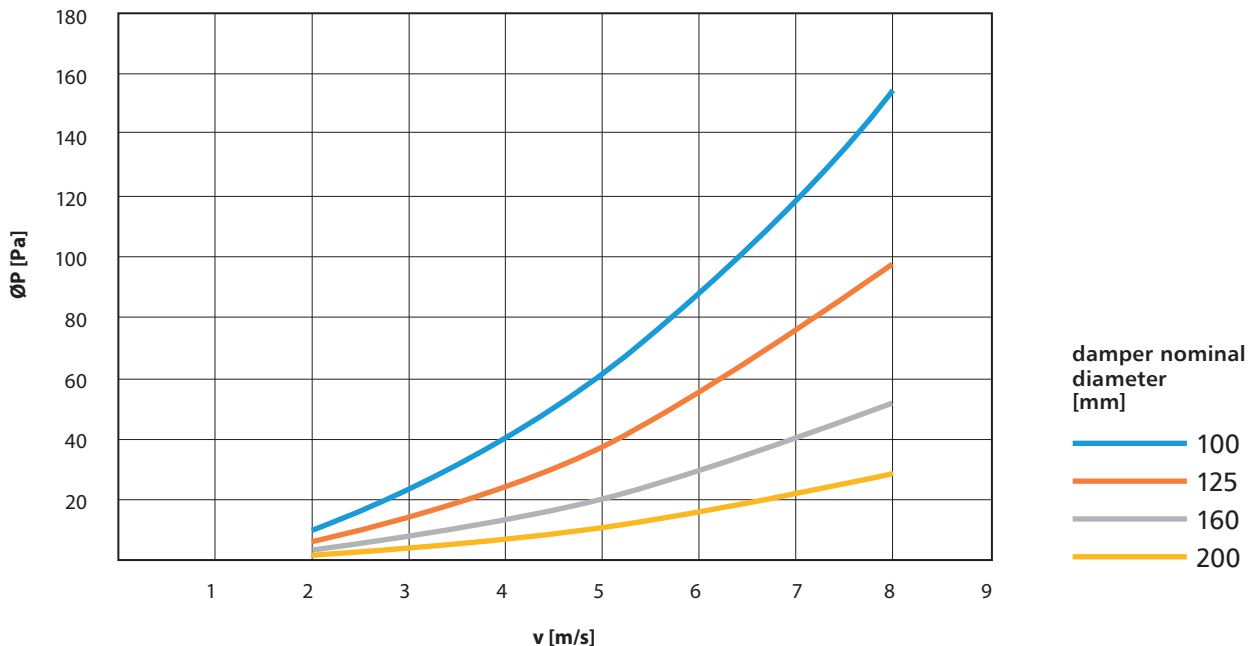
- 1. mcr FID WING fire damper
- 2. insulating wrap
- 3. ventilation duct
- 4. installation clearance filling*
- 5. service shaft
- 6. anemostat

* The method of filling the installation clearance is based on the fire resistance rating of the solution and the assembly method as shown in the drawings above. When the damper is installed in the service shaft openings (in technical shafts that are not designed for continuous presence or stay of people), it is not necessary to use the insulating wrap supplied with the damper. The fire damper should be placed at the duct side inside the shaft. Fire resistance rating of the shaft walls should be equal to or higher than that of the fire damper.

6.6 | mcr FID WING circular dampers technical parameters

product	D [mm ²]	S _k [m ²]	S _c [m ²]	v [m/s]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
mcr FID WING	100	0.008	0.002	2	58	11	27
				4	29	40	44
				6	43	88	54
				8	58	154	61
	125	0.012	0.004	2	29	6	24
				4	58	25	40
				6	86	55	49
				8	115	98	55
	160	0.02	0.01	2	72	3	17
				4	144	13	34
				6	216	30	44
				8	288	53	52
	200	0.031	0.017	2	122	2	16
				4	245	7	32
				6	367	16	41
				8	490	29	48

» pressure drop – mcr FID WING damper



6.7 | mcr FID WING circular fire dampers estimated weights

nominal diameter ØD [mm]	weight [kg]
100	0.3
125	0.4
160	0.5
200	0.9

6.8 | Accessories

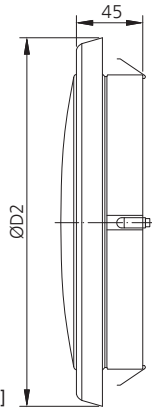
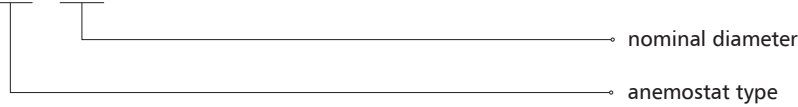
» anemostat



System AN anemostats are designed to fulfill either supply or exhaust function. They are made of plastic. They allow for an aesthetic system termination. They are equipped with a movable disc, allowing adjustment of the airflow supplied by the system. The body of the anemostat is attached to the ventilation duct with the connection collar supplied in the kit. The anemostat is fixed in the connection collar using strutting elements on the anemostat's perimeter. Such a solution allows for installing the product even in the most visually-demanding applications. Anemostats are supplied in RAL 9010 as a standard.

Marking

AN / ØD



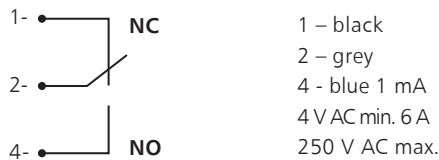
dimensions in [mm]

nominal diameter ØD [mm]	external diameter ØD2 [mm]
100	149
125	169
160	195
200	240

Trigger control mechanisms – specifications and connections diagram

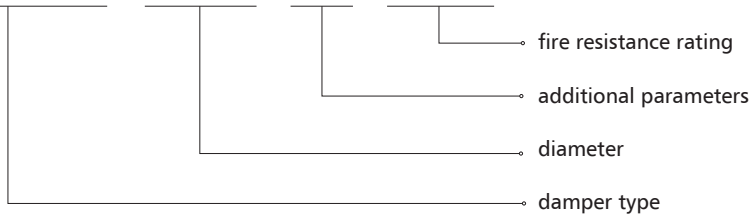
execution type	RST	RST + WK1
thermal trigger	+	+
limit switch	-	250 V AC / 6A

Electrical connections diagram for the mcr FID WING +WK1 damper



6.9 | Marking

mcr FID WING / DIA 200 / WK1 / EIS 120



additional parameters

- WK1 – limit switch – closed damper blade signal
- AN – anemostat

NOTE: separate additional parameters entered with the “/” sign

example marking:

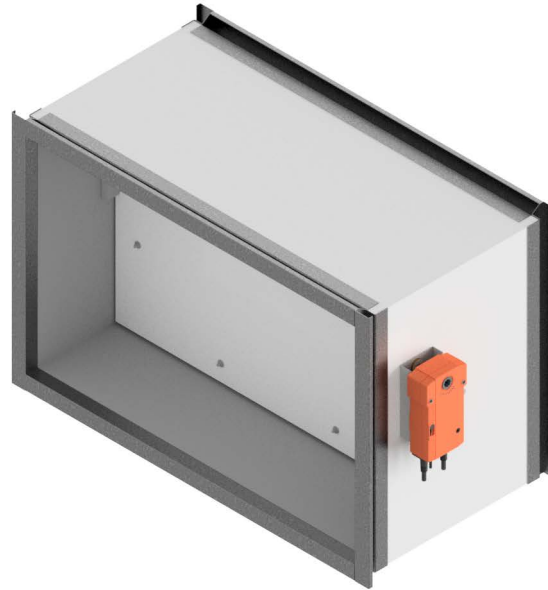
mcr FID WING / DIA 200 / AN / EIS120

EIS120 cut-off damper with a 74°C thermal trigger, equipped with an anemostat.

Chapter 16 - power supply and control (p. 262) contains the following information:
 - technical specifications and connection diagrams for the trigger control mechanisms supporting the damper.



downloadable models
on the website
under the designer zone tab



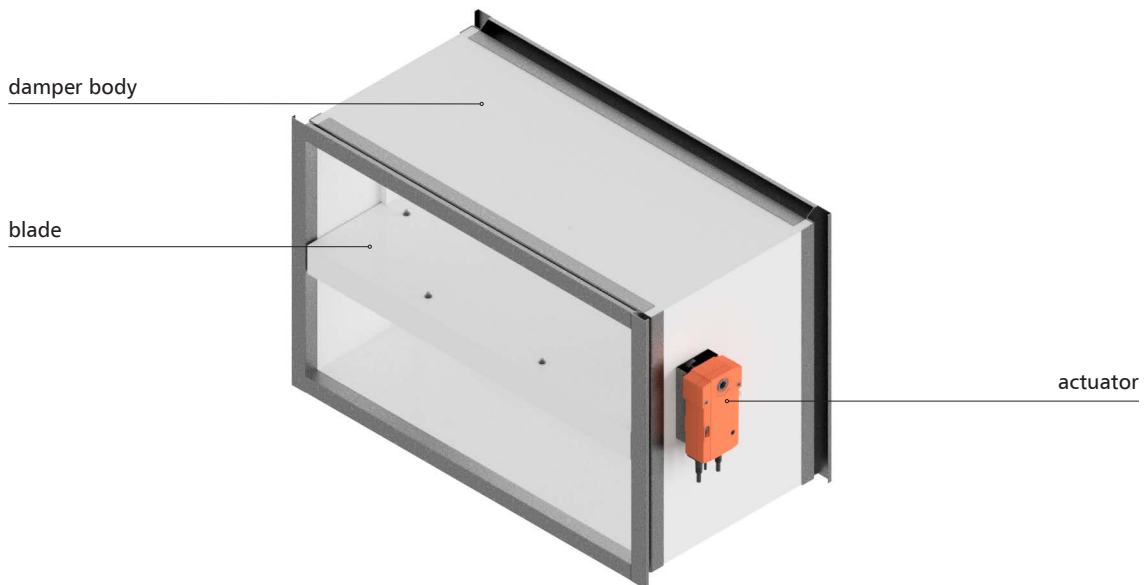
» **EIS240**

- » Fire resistance class: EI240 ($v_e i \leftrightarrow o$)S.
- » Certificate of constancy of performance 1391-CPR-2021/0123.
- » Dampers certified for compliance with EN 15650.
- » Dampers qualified under EN 13501-3 and tested under EN 1366-2.
- » Cut-off dampers resistance independent of airflow direction and installation side.
- » Certified installation in a dry system.

7.1 | Application

mcr FID 240 cut-off dampers are designed for installation in general ventilation systems at installation passages through vertical construction partitions. During a fire, they preserve the fire resistance rating of the construction partition that the ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and fire gasses 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, unless included in a special, individually developed service and technical inspections programme.

7.2 | Design



mcr FID 240 cut-off fire dampers consist of a casing with a rectangular cross-section composed of fire-proof boards, a moving damper blade and an actuator, which is activated remotely or automatically when the thermoelectric trigger is tripped. The total length of the casing is 310–460 mm, depending on the damper height dimension. The damper blade is made of a fire-proof panel with a total thickness of 60 mm. The inner side of the fire damper casing is equipped with a sealing system. Stop profiles are attached to the inner casing surface, limiting the rotating motion of the damper blade. As a standard, the damper is equipped with steel flanges allowing for the installation of masking grilles and connection of steel ventilation ducts.

7.3 | Versions

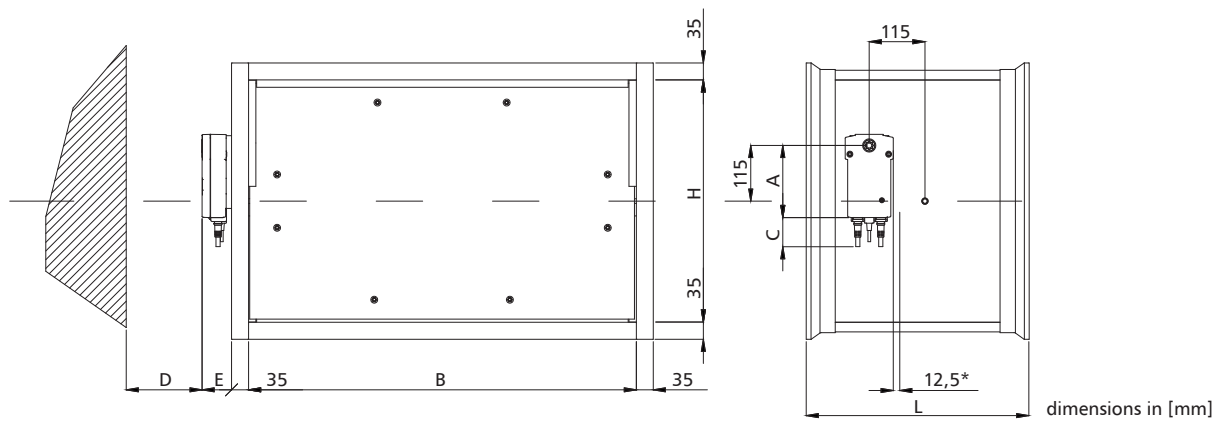
7.3.1 | Damper closing and opening with an actuator

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

The mcr FID 240 dampers are equipped with a trigger control mechanism in the form of BFL, BFN, BF-TL series axial actuator with a return spring, supplied with 24 V AC/DC or 230 V AC, with a 72°C thermoelectric trigger (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, a mechanical position indicator is placed on the actuator.

Thermoelectric triggers are equipped with a test switch.

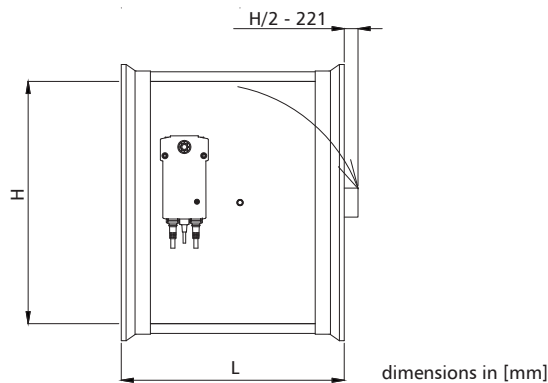
Dampers with analog BFL, BFN and digital BF-TL actuators close as a result of the thermoelectric trigger tripping or power supply cut-off as a result of the actuator return spring action. The dampers open when power supply voltage is applied to the actuator terminals. Dampers with those actuators may be opened manually using a key. In the case of fire, the damper blade in the compartment where the fire occurs opens and the damper blades in the remaining compartments are closed – the blades are operated remotely by supplying power.



mechanism	A	C	D	E	H	L
BF	198	10	75	80	200 ≤ H ≤ 250	310
BFN	157	30	75	72	250 < H ≤ 300	360
BFL	138	30	75	68	H > 300	460

*embedding border

7.4 | Dimensions

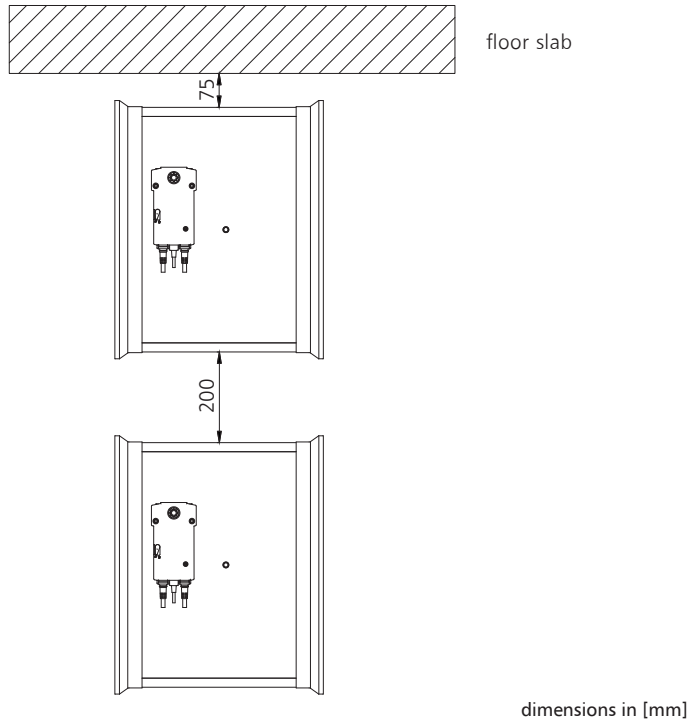


Rectangular dampers

- » nominal width B: from 200 mm to 1000 mm
- » nominal height H: from 200 mm to 800 mm
- » maximum single damper cross-section surface up to 0.73 m²
- » the design of the damper ensures that its damper blade, regardless of the dimensions of the BxH damper, does not protrude beyond the device casing on one side.

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

7.4.1 | Distance between systems and partitions

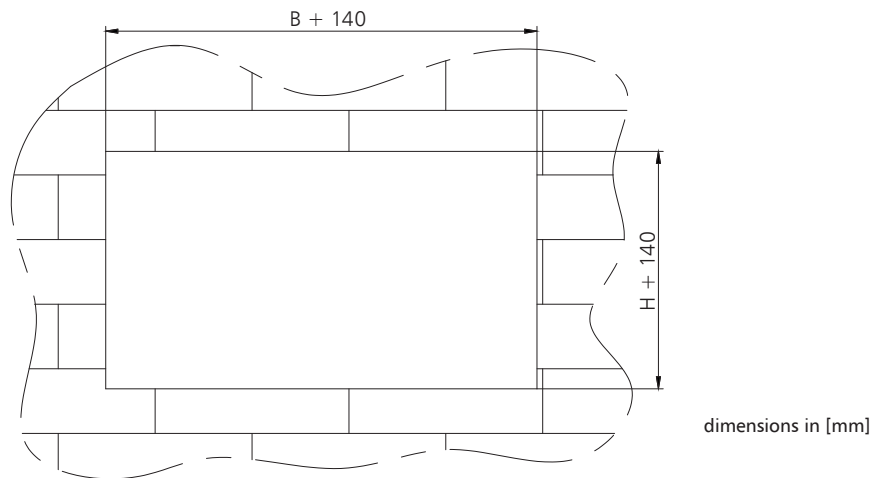


7.5 | Installation

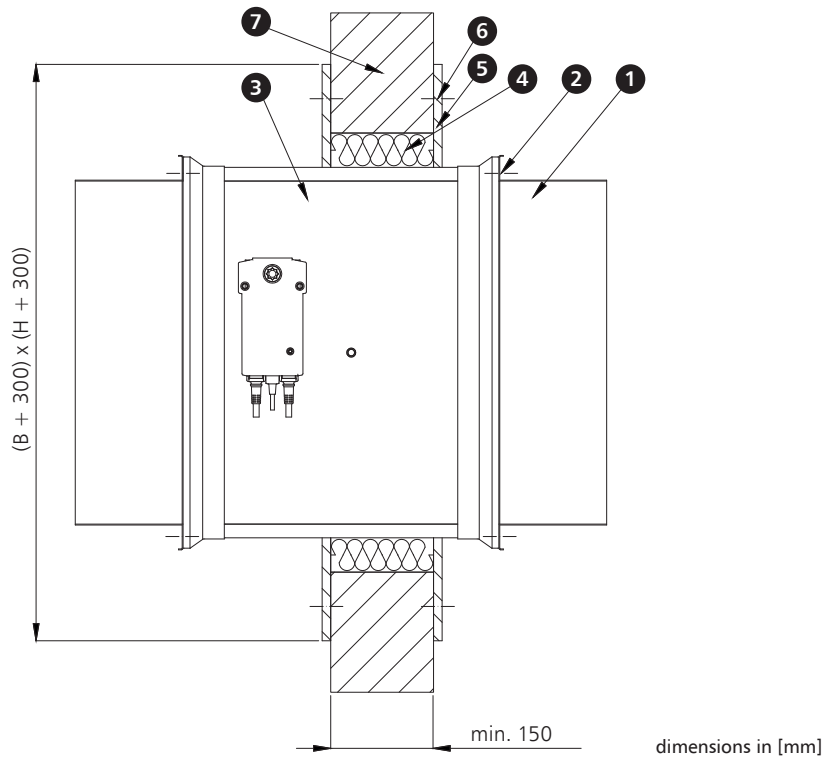
mcr FID 240 rectangular dampers are rated EI240(v_e i \leftrightarrow o)S. Dampers may be installed in concrete partitions with thickness of at least 150 mm, partitions made of full bricks or aerated concrete blocks with a thickness of at least 150 mm and the resistance rating no lesser than EI240.

7.5.1 | Installation damper mcr FID 240

» preferred opening



7.5.2 | Sample installation in brick and concrete walls



- 1. ventilation duct
- 2. ST4.2 x 16 sheet metal screw
- 3. mcr FID 240 BxH fire damper
- 4. Sealing – mineral wool*

- 5. Gypsum board trim along the entire length of the BxH side
- 6. Installation anchor
- 7. Wall

7.6 | mcr FID 240 rectangular dampers technical parameters

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		200					250					300					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4	0.040	0.022	317	11	31	0.050	0.031	450	9	31	0.06	0.041	583	8	31
		6			475	24	42			675	21	41			875	19	41
		8			634	43	49			900	37	49			1 166	33	49
		10			792	67	55			1 125	58	55			1 458	52	54
	250	4	0.050	0.028	407	11	32	0.063	0.040	576	9	32	0.075	0.052	745	8	32
		6			610	24	43			864	21	43			1 118	19	42
		8			814	42	50			1 152	37	50			1 490	33	50
		10			1 017	66	56			1 440	58	56			1 863	52	56
	300	4	0.060	0.035	497	11	33	0.000	0.049	702	9	33	0.09	0.063	907	8	33
		6			745	24	44			1 053	21	43			1 361	19	43
		8			994	42	51			1 404	37	51			1 814	33	51
		10			1 242	66	57			1 755	58	57			2 268	52	56
350	4	0.070	0.041	587	10	34	0.088	0.058	828	9	34	0.105	0.074	1 069	8	32	
	6			880	23	44			1 242	21	44			1 604	17	43	
	8			1 174	41	52			1 656	37	52			2 138	31	50	
	10			1 467	64	57			2 070	58	57			2 673	48	56	
400	4	0.080	0.047	677	10	34	0.100	0.066	954	8	33	0.12	0.086	1 231	8	33	
	6			1 015	22	44			1 431	19	44			1 847	17	44	
	8			1 354	40	52			1 908	34	51			2 462	31	51	
	10			1 692	62	58			2 385	53	57			3 078	48	57	
450	4	0.090	0.053	767	10	34	0.113	0.075	1 080	8	34	0.135	0.097	1 393	8	34	
	6			1 150	22	45			1 620	19	44			2 090	17	44	
	8			1 534	40	52			2 160	34	52			2 786	31	52	
	10			1 917	62	58			2 700	53	57			3 483	48	57	
500	4	0.100	0.060	857	11	37	0.125	0.084	1 206	8	34	0.15	0.108	1 555	8	34	
	6			1 285	26	47			1 809	18	44			2 333	17	45	
	8			1 714	46	55			2 412	32	52			3 110	31	52	
	10			2 142	71	60			3 015	51	57			3 888	48	58	
550	4	0.110	0.066	947	10	35	0.138	0.093	1 332	7	33	0.165	0.119	1 717	7	34	
	6			1 420	22	46			1 998	17	43			2 576	17	44	
	8			1 894	40	53			2 664	29	51			3 434	29	52	
	10			2 367	62	59			3 330	46	57			4 293	46	58	
600	4	0.120	0.072	1 037	10	36	0.150	0.101	1 458	7	33	0.18	0.131	1 879	6	32	
	6			1 555	22	46			2 187	17	44			2 819	15	43	
	8			2 074	40	54			2 916	29	51			3 758	26	51	
	10			2 592	62	59			3 645	46	57			4 698	40	56	
650	4	0.130	0.078	1 127	10	36	0.163	0.110	1 584	7	33	0.195	0.142	2 041	7	35	
	6			1 690	22	46			2 376	17	44			3 062	17	45	
	8			2 254	40	54			3 168	29	52			4 082	29	53	
	10			2 817	62	60			3 960	46	57			5 103	46	58	
700	4	0.140	0.085	1 217	10	36	0.175	0.119	1 710	7	34	0.21	0.153	2 203	7	35	
	6			1 825	22	46			2 565	17	44			3 305	17	45	
	8			2 434	38	54			3 420	29	52			4 406	29	53	
	10			3 042	60	60			4 275	46	58			5 508	46	59	

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		200					250					300					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	750	4	0.150	0.091	1 307	10	36	0.188	0.128	1 836	7	34	0.225	0.164	2 365	7	35
		6			1 960	22	47			2 754	17	45			3 548	17	46
		8			2 614	38	54			3 672	29	52			4 730	29	53
		10			3 267	60	60			4 590	46	58			5 913	46	59
	800	4	0.160	0.097	1 397	9	36	0.200	0.136	1 962	7	34	0.24	0.176	2 527	7	35
		6			2 095	21	46			2 943	17	45			3 791	17	46
		8			2 794	37	54			3 924	29	52			5 054	29	54
		10			3 492	58	60			4 905	46	58			6 318	46	59
	850	4	0.170	0.103	1 487	8	35	0.213	0.145	2 088	6	32	0.255	0.187	2 689	6	32
		6			2 230	19	45			3 132	14	43			4 034	13	43
		8			2 974	33	53			4 176	24	50			5 378	23	50
		10			3 717	52	59			5 220	38	56			6 723	36	56
900	4	0.180	0.110	1 577	8	35	0.225	0.154	2 214	6	32	0.27	0.198	2 851	6	33	
	6			2 365	19	46			3 321	14	43			4 277	13	44	
	8			3 154	33	53			4 428	24	50			5 702	24	51	
	10			3 942	52	59			5 535	38	56			7 128	37	57	
960	4	0.192	0.117	1 685	8	35	0.240	0.164	2 365	6	33	0.288	0.212	3 046	6	33	
	6			2 527	19	46			3 548	14	43			4 568	13	44	
	8			3 370	33	53			4 730	24	51			6 091	24	51	
	10			4 212	52	59			5 913	38	57			7 614	37	57	

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		350					400					450					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4	0.070	0.050	716	8	30	0.080	0.059	850	6	29	0.090	0.068	983	7	31
		6			1 075	17	41			1 274	15	40			1 474	17	42
		8			1 433	30	48			1 699	26	47			1 966	30	50
		10			1 791	47	54			2 124	40	53			2 457	46	55
	250	4	0.088	0.064	914	7	30	0.100	0.075	1 084	6	30	0.113	0.087	1 253	7	33
		6			1 372	15	40			1 625	15	41			1 879	17	43
		8			1 829	27	48			2 167	26	48			2 506	30	51
		10			2 286	41	54			2 709	40	54			3 132	46	56
	300	4	0.105	0.077	1 112	7	31	0.120	0.092	1 318	6	31	0.135	0.106	1 523	7	33
		6			1 669	15	41			1 976	15	41			2 284	16	44
		8			2 225	27	49			2 635	26	49			3 046	29	51
		10			2 781	41	54			3 294	40	55			3 807	45	57
350	4	0.123	0.091	1 310	7	31	0.140	0.108	1 552	6	32	0.158	0.125	1 793	7	33	
	6			1 966	15	42			2 327	15	42			2 689	16	44	
	8			2 621	27	49			3 103	26	50			3 586	28	51	
	10			3 276	41	55			3 879	40	55			4 482	44	57	
400	4	0.140	0.105	1 508	6	30	0.160	0.124	1 786	6	31	0.180	0.143	2 063	7	34	
	6			2 263	13	41			2 678	13	42			3 094	15	44	
	8			3 017	24	48			3 571	24	49			4 126	27	52	
	10			3 771	37	54			4 464	37	55			5 157	42	57	
450	4	0.158	0.119	1 706	7	33	0.180	0.140	2 020	6	32	0.203	0.162	2 333	6	32	
	6			2 560	15	43			3 029	13	42			3 499	13	43	
	8			3 413	27	51			4 039	24	50			4 666	24	50	
	10			4 266	43	57			5 049	37	55			5 832	37	56	
500	4	0.175	0.132	1 904	6	33	0.200	0.157	2 254	6	31	0.225	0.181	2 603	6	32	
	6			2 857	15	43			3 380	12	42			3 904	12	42	
	8			3 809	26	51			4 507	22	49			5 206	22	50	
	10			4 761	40	56			5 634	35	55			6 507	34	56	
550	4	0.193	0.146	2 300	6	33	0.220	0.173	2 488	5	30	0.248	0.200	2 873	6	32	
	6			3 451	15	44			3 731	11	40			4 309	12	43	
	8			4 601	26	51			4 975	19	48			5 746	22	50	
	10			5 751	40	57			6 219	30	54			7 182	34	56	
600	4	0.210	0.160	2 300	5	31	0.240	0.189	2 722	5	30	0.270	0.218	3 143	6	33	
	6			3 451	12	41			4 082	9	39			4 714	12	43	
	8			4 601	21	49			5 443	16	46			6 286	22	51	
	10			5 751	33	55			6 804	25	52			7 857	34	56	
650	4	0.228	0.174	2 498	5	31	0.260	0.205	2 956	4	28	0.293	0.237	3 413	5	31	
	6			3 748	12	42			4 433	9	39			5 119	10	41	
	8			4 997	21	49			5 911	16	46			6 826	19	49	
	10			6 246	33	55			7 389	25	52			8 532	29	55	
700	4	0.245	0.187	2 696	5	32	0.28	0.222	3 190	4	29	0.315	0.256	3 683	5	31	
	6			4 045	12	42			4 784	9	39			5 524	10	42	
	8			5 393	21	50			6 379	16	47			7 366	19	49	
	10			6 741	33	55			7 974	25	53			9 207	29	55	

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		350					400					450					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	750	4	0.263	0.201	2 894	5	31	0.3	0.238	3 424	4	29	0.338	0.275	3 953	5	31
		6			4 342	12	42			5 135	9	40			5 929	10	42
		8			5 789	21	49			6 847	16	47			7 906	19	50
		10			7 236	32	55			8 559	25	53			9 882	29	55
	800	4	0.280	0.215	3 092	5	32	0.32	0.254	3 658	4	29	0.360	0.293	4 223	5	31
		6			4 639	12	42			5 486	9	40			6 334	10	41
		8			6 185	21	50			7 315	16	47			8 446	19	49
		10			7 731	32	56			9 144	25	53			10 557	29	55
	850	4	0.298	0.229	3 290	5	32	0.34	0.270	3 892	5	32	0.383	0.312	4 493	5	31
		6			4 936	12	43			5 837	11	42			6 739	10	41
		8			6 581	21	50			7 783	19	50			8 986	19	49
		10			8 226	32	56			9 729	30	56			11 232	29	55
900	4	0.315	0.242	3 488	6	34	0.360	0.287	4 126	7	37	0.405	0.331	4 763	5	31	
	6			5 233	14	45			6 188	14	46			7 144	10	41	
	8			6 977	24	52			8 251	30	56			9 526	19	49	
	10			8 721	38	58			10 314	38	59			11 907	29	55	
960	4	0.336	0.259	3 726	5	32	0.384	0.306	4 406	5	32	0.432	0.353	5 087	5	31	
	6			5 589	11	42			6 610	11	43			7 630	10	41	
	8			7 452	19	50			8 813	19	50			10 174	19	49	
	10			9 315	30	55			11 016	30	56			12 717	29	55	

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		500					550					600					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4	0.1	0.078	1 116	6	30	0.110	0.087	1 249	6	30	0.120	0.096	1 382	6	30
		6			1 674	15	41			1 874	14	40			2 074	13	41
		8			2 232	26	48			2 498	24	48			2 765	24	48
		10			2 790	40	54			3 123	38	54			3 456	37	54
	250	4	0.125	0.099	1 422	6	31	0.138	0.111	1 591	6	31	0.150	0.122	1 760	6	31
		6			2 133	15	42			2 387	14	42			2 641	13	42
		8			2 844	26	49			3 182	24	49			3 521	24	49
		10			3 555	40	55			3 978	38	55			4 401	37	55
	300	4	0.15	0.120	1 728	6	31	0.165	0.134	1 933	6	31	0.180	0.149	2 138	6	31
		6			2 592	14	42			2 900	13	42			3 208	12	42
		8			3 456	24	49			3 866	24	49			4 277	22	49
		10			4 320	38	55			4 833	37	55			5 346	35	55
350	4	0.175	0.141	2 034	6	32	0.193	0.158	2 275	6	32	0.210	0.175	2 516	5	31	
	6			3 051	13	42			3 413	13	43			3 775	12	42	
	8			4 068	24	50			4 550	24	50			5 033	21	49	
	10			5 085	37	55			5 688	37	56			6 291	33	55	
400	4	0.2	0.163	2 340	6	31	0.220	0.182	2 617	5	31	0.240	0.201	2 894	5	31	
	6			3 510	12	42			3 926	12	42			4 342	12	42	
	8			4 680	22	49			5 234	21	49			5 789	21	49	
	10			5 850	35	55			6 543	33	55			7 236	32	55	
450	4	0.225	0.184	2 646	5	30	0.248	0.206	2 959	5	31	0.270	0.227	3 272	5	31	
	6			3 969	11	41			4 439	11	41			4 909	11	42	
	8			5 292	19	48			5 918	19	49			6 545	19	49	
	10			6 615	30	54			7 398	30	54			8 181	30	55	
500	4	0.250	0.205	2 952	4	28	0.275	0.229	3 301	4	30	0.300	0.254	3 650	4	30	
	6			4 428	9	39			4 952	10	41			5 476	10	41	
	8			5 904	16	46			6 602	18	48			7 301	18	48	
	10			7 380	23	51			8 253	28	54			9 126	28	54	
550	4	0.275	0.226	3 564	4	28	0.303	0.253	3 985	4	29	0.330	0.280	4 406	4	30	
	6			5 346	9	39			5 978	9	40			6 610	9	40	
	8			7 128	15	46			7 970	16	47			8 813	16	48	
	10			8 910	24	52			9 963	25	53			11 016	25	54	
600	4	0.3	0.248	3 564	4	29	0.330	0.277	3 985	4	29	0.360	0.306	4 406	4	29	
	6			5 346	9	39			5 978	9	40			6 610	9	40	
	8			7 128	15	47			7 970	15	47			8 813	15	48	
	10			8 910	24	52			9 963	24	53			11 016	24	53	
650	4	0.325	0.269	3 870	5	31	0.358	0.301	4 327	4	29	0.390	0.332	4 784	4	30	
	6			5 805	10	42			6 491	9	40			7 177	9	40	
	8			7 740	19	49			8 654	15	47			9 569	15	48	
	10			9 675	24	53			10 818	24	53			11 961	24	54	
700	4	0.350	0.290	4 176	4	29	0.385	0.324	4 669	4	30	0.420	0.359	5 162	4	30	
	6			6 264	9	40			7 004	9	40			7 744	9	41	
	8			8 352	15	47			9 338	15	48			10 325	15	48	
	10			10 440	24	53			11 673	24	54			12 906	24	54	

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		500					550					600					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	750	4	0.375	0.311	4 482	4	30	0.413	0.348	5 011	4	29	0.450	0.385	5 540	4	30
		6			6 723	9	40			7 517	8	40			8 311	8	40
		8			8 964	15	48			10 022	15	47			11 081	15	48
		10			11 205	24	53			12 528	23	53			13 851	23	54
	800	4	0.4	0.333	4 788	4	30	0.440	0.372	5 353	4	30	0.480	0.411	5 918	3	29
		6			7 182	9	40			8 030	8	40			8 878	7	39
		8			9 576	15	48			10 706	15	48			11 837	13	47
		10			11 970	24	53			13 383	23	54			14 796	21	53
	850	4	0.425	0.354	5 094	46	62	0.468	0.396	5 695	4	29	0.510	0.437	6 296	3	28
		6			7 641	104	72			8 543	8	40			9 445	7	39
		8			10 188	185	80			11 390	14	47			12 593	13	46
		10			12 735	289	86			14 238	22	53			15 741	20	52
	900	4	0.45	0.375	5 400	4	30	0.495	0.419	6 037	3	29	0.540	0.464	6 674	3	29
		6			8 100	9	40			9 056	7	39			10 012	7	36
		8			10 800	15	48			12 074	13	47			13 349	13	44
		10			13 500	24	53			15 093	21	53			16 686	20	49
	960	4	0.48	0.401	5 767	4	29	0.528	0.448	6 037	3	28	0.576	0.495	7 128	3	28
		6			8 651	8	39			9 056	7	38			10 692	7	39
		8			11 534	15	47			12 074	12	46			14 256	12	46
		10			14 418	23	53			15 093	18	51			17 820	18	52

B – nominal width [mm]
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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		650					700					800					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.130	0.105	1 516	6	30	0.140	0.115	1 649	6	30	0.152	0.145	2 081	6	31
		6			2 273	13	40			2 473	13	41			3 121	13	42
		8			3 031	23	48			3 298	23	48			4 162	23	49
		10			3 789	36	54			4 122	36	54			5 202	36	55
	250	4	0.163	0.134	1 930	6	31	0.175	0.146	2 099	6	31	0.190	0.181	2 601	6	32
		6			2 894	13	42			3 148	13	42			3 902	13	43
		8			3 859	23	49			4 198	23	49			5 202	23	50
		10			4 824	36	55			5 247	36	55			6 503	36	56
	300	4	0.195	0.163	2 344	5	31	0.210	0.177	2 549	5	31	0.228	0.217	3 121	5	32
		6			3 515	12	42			3 823	12	41			4 682	12	42
		8			4 687	21	49			5 098	21	49			6 242	21	50
		10			5 859	33	55			6 372	32	55			7 803	32	56
	350	4	0.228	0.192	2 758	5	31	0.245	0.208	2 999	5	31	0.266	0.253	3 641	5	32
		6			4 136	12	42			4 498	11	42			5 462	11	43
		8			5 515	21	49			5 998	20	49			7 283	20	50
		10			6 894	32	55			7 497	31	55			9 104	31	56
	400	4	0.260	0.220	3 172	5	32	0.280	0.240	3 449	5	32	0.304	0.289	4 162	5	33
		6			4 757	12	42			5 173	11	42			6 242	11	43
		8			6 343	21	50			6 898	20	50			8 323	20	51
		10			7 929	32	56			8 622	31	56			10 404	31	56
	450	4	0.293	0.249	3 586	5	31	0.315	0.271	3 899	4	31	0.342	0.325	4 682	4	31
		6			5 378	11	42			5 848	10	41			7 023	10	42
		8			7 171	19	49			7 798	18	49			9 364	18	50
		10			8 964	30	55			9 747	28	55			11 705	28	55
	500	4	0.325	0.278	4 000	4	31	0.350	0.302	4 349	4	31	0.380	0.361	5 202	4	31
		6			5 999	10	41			6 523	10	41			7 803	10	42
		8			7 999	18	49			8 698	17	49			10 404	17	49
		10			9 999	28	55			10 872	26	54			13 005	26	55
550	4	0.358	0.307	4 828	4	30	0.385	0.333	4 799	4	30	0.418	0.397	5 722	4	31	
	6			7 241	9	41			7 198	9	41			8 583	9	42	
	8			9 655	16	48			9 598	16	49			11 444	16	49	
	10			12 069	25	54			11 997	25	54			14 306	25	55	
600	4	0.390	0.335	4 828	4	30	0.420	0.365	5 249	4	30	0.456	0.434	6 242	4	31	
	6			7 241	9	40			7 873	9	41			9 364	9	42	
	8			9 655	15	48			10 498	15	48			12 485	15	49	
	10			12 069	24	54			13 122	24	54			15 606	24	55	
650	4	0.423	0.364	5 242	4	30	0.455	0.396	5 699	4	30	0.494	0.470	6 763	4	30	
	6			7 862	8	40			8 548	8	41			10 144	8	41	
	8			10 483	15	48			11 398	15	48			13 525	14	48	
	10			13 104	23	53			14 247	23	54			16 907	22	54	
700	4	0.455	0.393	5 656	4	30	0.490	0.427	6 149	4	30	0.532	0.506	7 283	4	30	
	6			8 483	8	41			9 223	8	41			10 924	8	41	
	8			11 311	15	48			12 298	15	48			14 566	14	48	
	10			14 139	23	54			15 372	23	54			18 207	22	54	

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

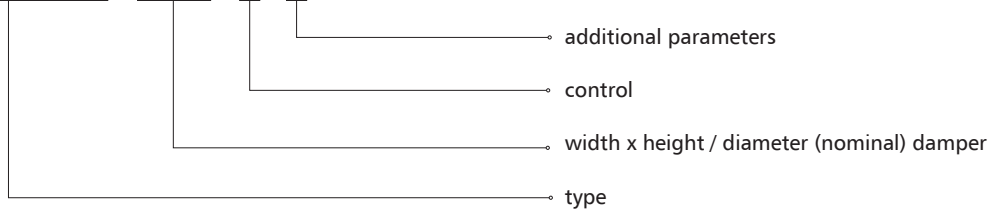
		height H [mm]															
		650					700					800					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	750	4	0.488	0.422	6 070	4	30	0.525	0.458	6 599	4	31	0.570	0.542	7 803	4	31
		6			9 104	8	41			9 898	8	41			11 705	8	41
		8			12 139	15	48			13 198	15	49			15 606	14	49
		10			15 174	23	54			16 497	23	54			19 508	22	55
	800	4	0.520	0.450	6 484	3	29	0.560	0.490	7 049	5	31	0.608	0.578	8 323	3	30
		6			9 725	7	39			10 573	8	38			12 485	7	41
		8			12 967	13	47			14 098	13	44			16 646	13	48
		10			16 209	21	53			17 622	18	48			20 808	21	54
	850	4	0.553	0.479	6 898	3	27	0.595	0.521	7 499	3	28	0.646	0.614	8 843	3	29
		6			10 346	7	38			11 248	7	39			13 265	7	40
		8			13 795	12	45			14 998	12	46			17 687	12	47
		10			17 244	18	51			18 747	18	52			22 109	18	53
900	4	0.585	0.508	7 312	3	27	0.630	0.552	7 949	3	29	0.684	0.650	9 364	3	29	
	6			10 967	7	38			11 923	7	39			14 045	7	40	
	8			14 623	12	45			15 898	12	47			18 727	12	47	
	10			18 279	18	51			19 872	18	52			23 409	18	53	
960	4	0.624	0.542	7 808	3	27	0.672	0.590	8 489	3	29	0.730	0.694	9 988	3	30	
	6			11 713	7	38			12 733	7	39			14 982	7	40	
	8			15 617	12	45			16 978	12	47			19 976	12	48	
	10			19 521	18	51			21 222	18	53			24 970	18	53	

7.7 | Estimated weight of the mcr FID 240 rectangular dampers [kg]

		width B [mm]															
		200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	1000
height H [mm]	200	10	11	12	13	14	15	16	17	18	20	21	22	23	24	25	26
	250	11	12	13	15	16	17	18	19	20	22	23	24	25	26	27	29
	300	12	13	15	16	17	19	20	21	22	24	25	26	27	29	30	32
	350	13	15	16	17	19	20	22	23	24	26	27	28	30	31	33	34
	400	14	16	17	19	20	22	23	25	26	28	29	31	32	34	35	37
	450	15	17	19	20	22	23	25	27	28	30	31	33	35	36	38	40
	500	16	18	20	22	23	25	27	28	30	32	34	35	37	39	41	43
	550	17	19	21	23	25	27	28	30	32	34	36	38	39	41	43	45
	600	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
	650	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	51
700	21	23	25	27	29	31	34	36	38	40	42	45	47	49	51	54	
800	22	24	26	29	31	33	36	38	40	43	45	47	50	52	54	57	

7.8 | **Marking**

mcr FID 240 / B x H / 1 / 2



1 - control:

» trigger and control mechanism, axial actuator

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

BFL 24-T / BFL 24-SR-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

BFN 24-T / BFN 24-SR-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 - additional parameters :

» Thermoelectric and thermal triggers

[no symbol] – 72°C trigger

ZBAT95 – thermoelectric trigger for 95°C

NOTE: separate additional parameters entered with the “/” sign

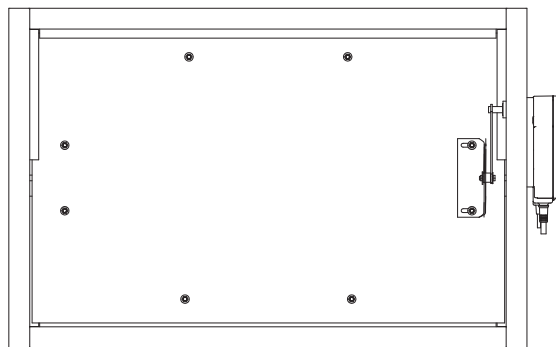
example marking:

mcr FID 240/S /500 x 600 /BFL 24-T

EIS240 cut-off damper with a 24 V actuator with limit switches.

7.8.1 | **Design standard**

» right damper - standard



Chapter 16 - power supply and control (p. 262) contains the following information:
 - technical specifications and connection diagrams for the trigger control mechanisms supporting the damper.



downloadable models
on the website
under the designer zone tab

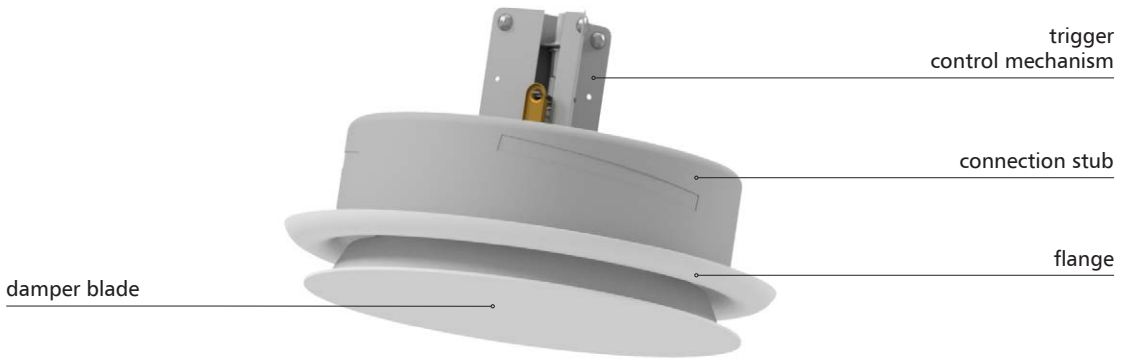


- » **EIS120**
- » Fire resistance class: EI120 (v_e h_o o→i)S, EI120 (v_e i→o), EI180 (v_e o→i)S.
- » Certificate of constancy of performance 1396-CPR-0092.
- » Valves certified for compliance with EN 15650.
- » Valves qualified under EN 13501-3 and tested under EN 1366-2.
- » Airflow adjustment function and cut-off damper in one device

8.1 | Application

The mcr ZIPP cut-off fire valves are designed for installation at the terminal points of general ventilation systems, where those systems pass through construction partitions. They are used to separate a 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, 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 egress routes from smoke, in which case they remain open during the fire and ensure a supply of fresh air to egress 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.

8.2 | Design



mcr ZIPP cut-off valves consist of a casing with a circular cross-section, a moving blade (cover), a connection stub and a trigger control mechanism activated when the thermal or electromagnetic trigger trips, whereby the automatic trip of the thermal trigger overrides remote power supply or disconnection. The connection stub is made of galvanized steel sheet. The valve flange is made of powder-painted steel sheets. The insulation blade of the valve is made of a material that provides fire protection, coated on the outside with powder-painted steel sheets. 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 means of thermal trigger tripping (RST trigger control mechanism),
- » remotely, by means of electromagnetic and thermal trigger tripping (RST+EK trigger control mechanism). As a standard, the valves are painted in RAL 9010.

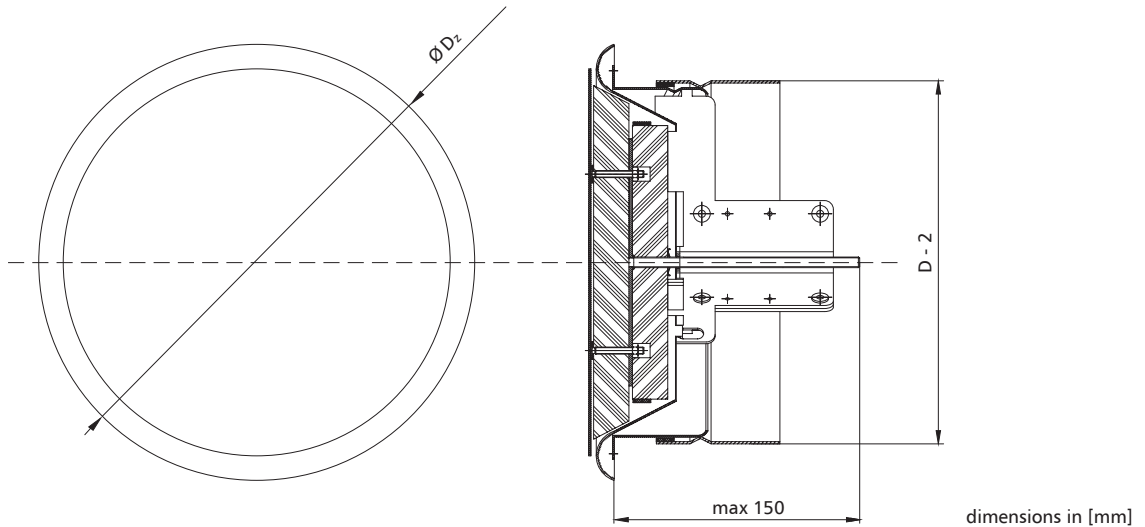
8.3 | Versions

8.3.1 | mcr ZIPP RST – 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.

mcr ZIPP RST valves are equipped with an RST trigger and control mechanism with a 74°C thermal trigger (it is possible to use a thermal trigger with the nominal tripping temperature of 95°C as an option) and drive spring. Once 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.

» closed valve blade

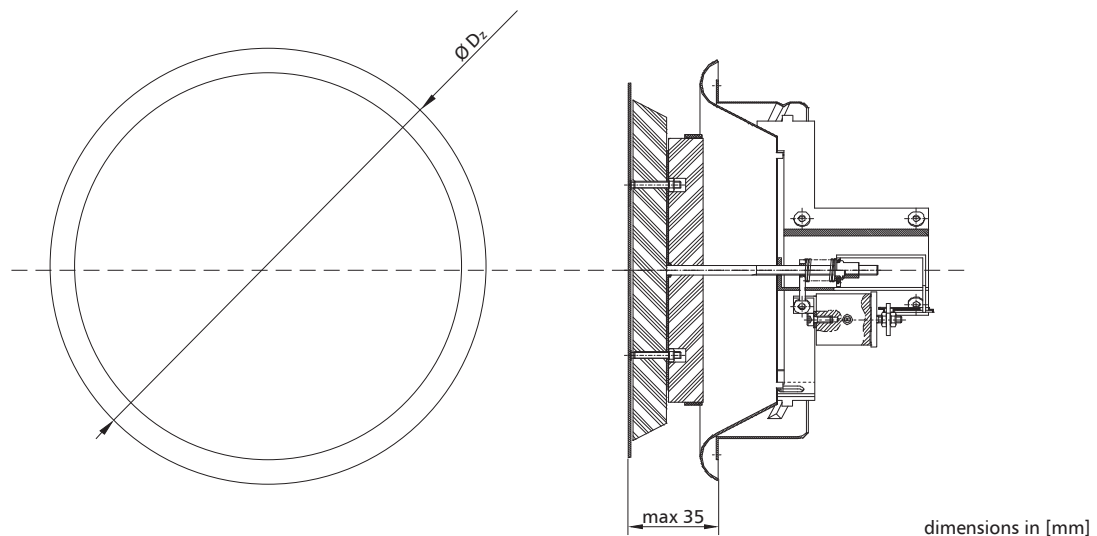


8.3.2 | mcr ZIPP RST+EK – cut-off fire valve for ventilation ducts with an electromagnetic and thermal trigger

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

mcr ZIPP RST+EK valves are equipped with a trigger control mechanism with a 74°C thermal trigger (optionally 95°C), a spring drive and an electromagnetic trigger tripped by the power supply application (“pulse”) or removal (“break”).

» open valve blade



8.4 | Dimensions

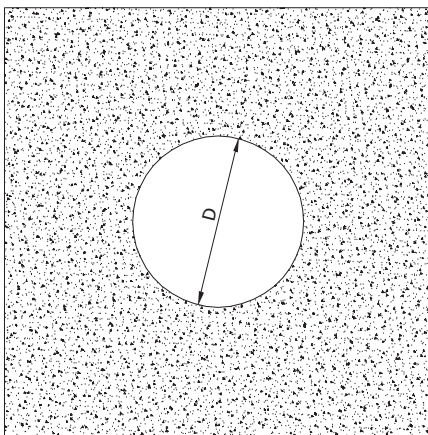
» **Circular valves:**
nominal diameter D: 100 mm, 125 mm, 160 mm, 200 mm.

8.5 | Installation

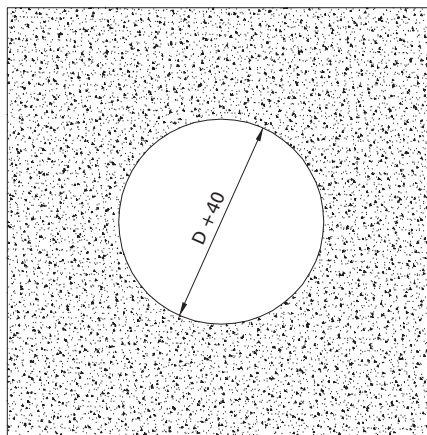
mcr ZIPP valves are rated EI120(v_e h_o o→i)S if installed in concrete partitions, partitions made of full bricks or aerated concrete blocks with a thickness of at least 110 mm, gypsum board light walls on a steel framework with a thickness of min. 125 mm and EI120 or higher fire rating, as well as concrete floor slabs with a thickness of at least 150 mm.

8.5.1 | Preparation of installation openings

» **in light gypsum board walls**
– preferred opening



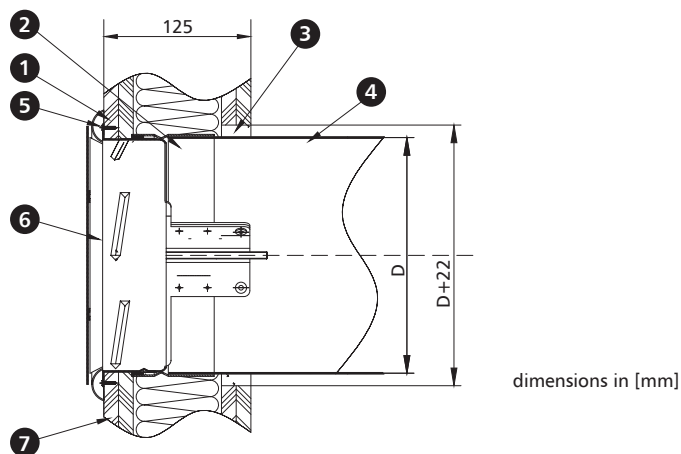
» **in rigid walls and floor slabs**
– preferred opening



dimensions in [mm]

8.5.2 | Sample installation in gypsum board light walls on a steel framework

» duct installation



- | | |
|-----------------------------|----------------------------|
| 1. gypsum board | 5. gypsum board screw |
| 2. extension stub | 6. mcr ZIPP valve |
| 3. sealing - gypsum mortar* | 7. gypsum board light wall |
| 4. ventilation duct | |

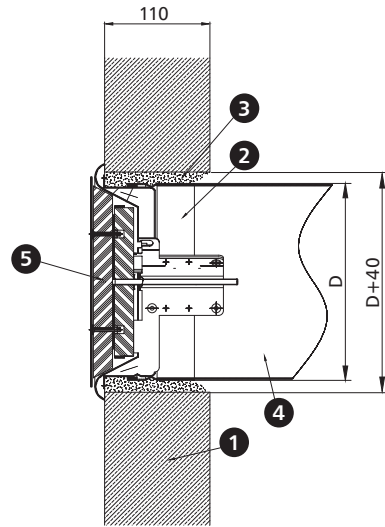
*it is possible to use a different filling that ensures the required fire resistance

8.5.3 | Sample installation in brick and concrete walls

» duct installation

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

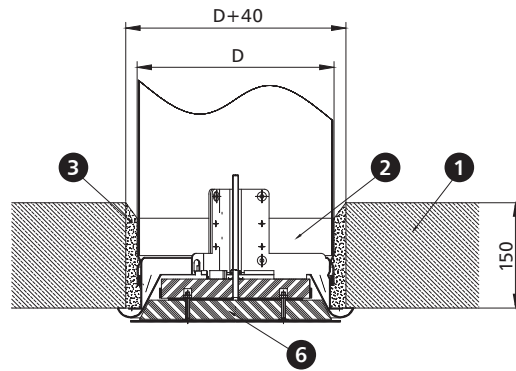
*it is possible to use a different filling that ensures the required fire resistance



dimensions in [mm]

8.5.4 | Sample installation in floor slabs

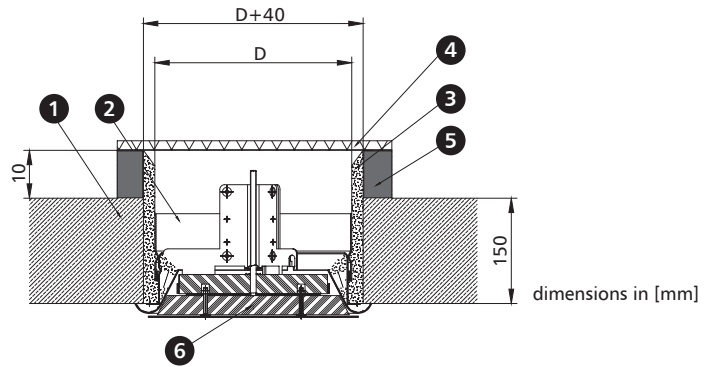
» duct installation



- 1. floor slab
- 2. extension stub
- 3. sealing - plaster or cement mortar*
- 4. masking element (not included)
- 6. mcr ZIPP valve

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

» ductless installation



- 1. floor slab
- 2. extension stub
- 3. sealing - plaster or cement mortar*
- 4. circumferential trim or masking element with suitable height
- 6. mcr ZIPP valve

dimensions in [mm]

8.6 | mcr ZIPP valves technical parameters

S_e – valve active cross-section [m²]
 S_k – duct cross-section [m²]
 D – nominal diameter [mm]

diameter D [mm]	100	125	160	200
S_e	0,0027	0,0055	0,0111	0,0191
S_k	0,0079	0,0123	0,0201	0,0314

» Flow characteristics

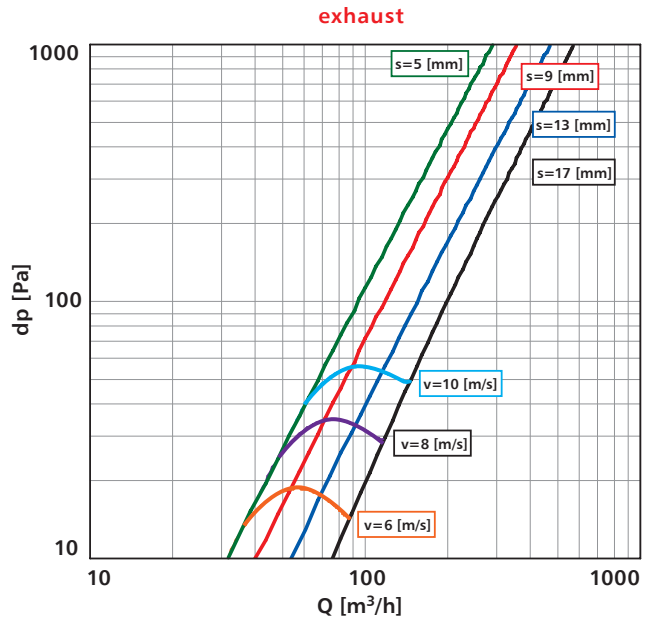
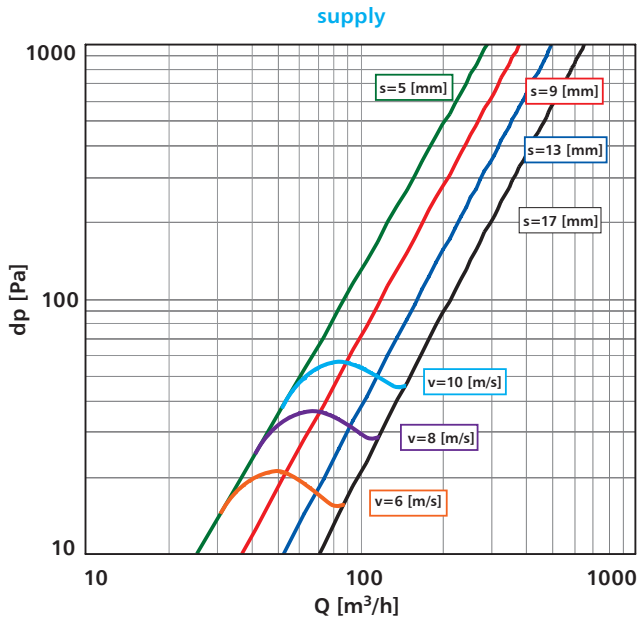
d_p – pressure drop [Pa]

s – valve opening [mm]

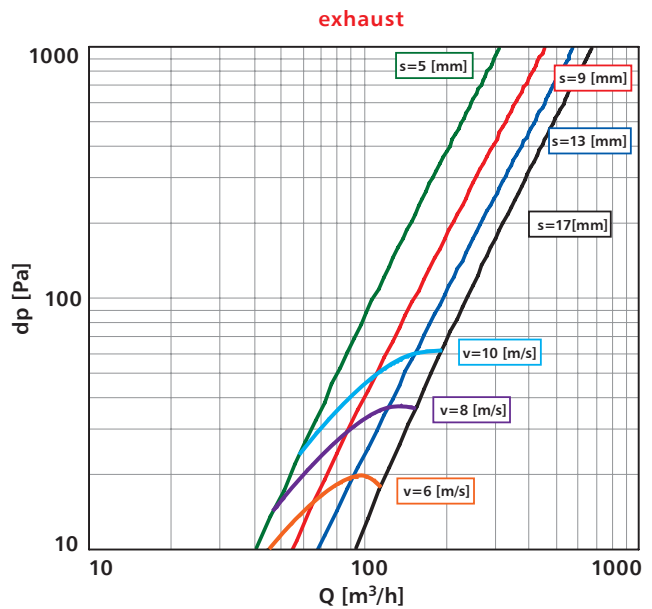
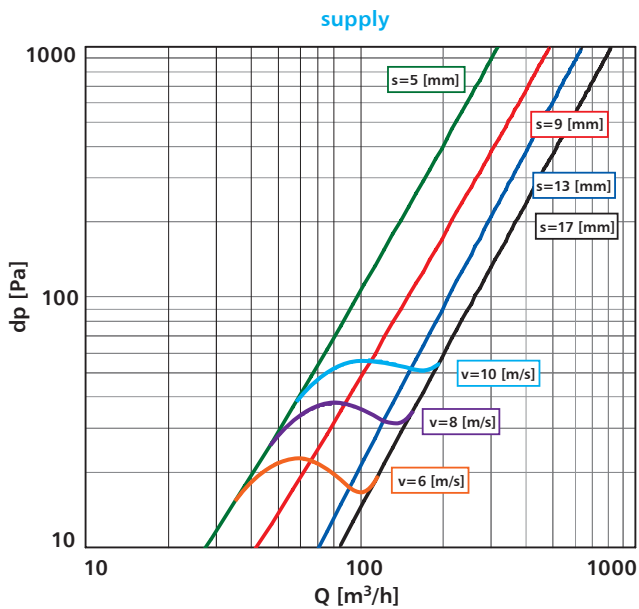
v – velocity [m/s]

Q – flow [m^3/h]

» mcr ZIPP 100 flow characteristics



» mcr ZIPP 125 flow characteristics



» Flow characteristics

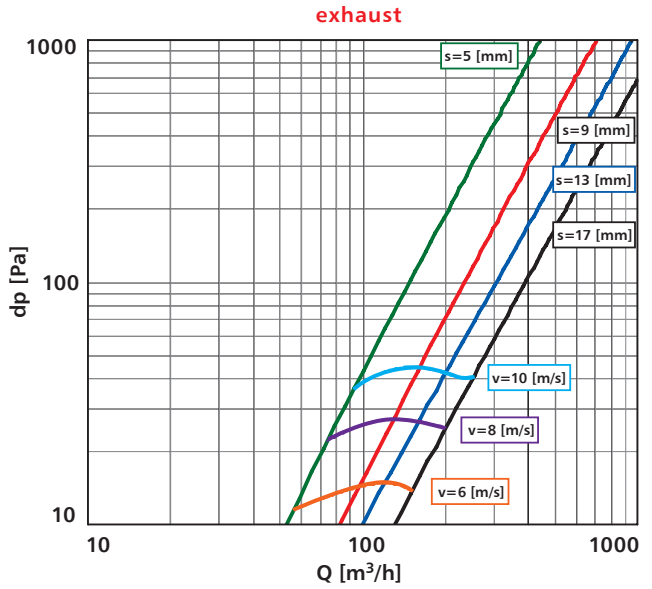
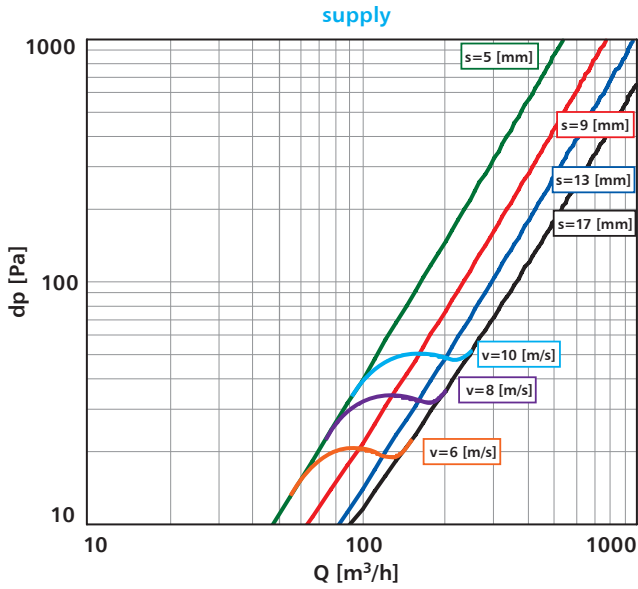
d_p – pressure drop [Pa]

s – valve opening [mm]

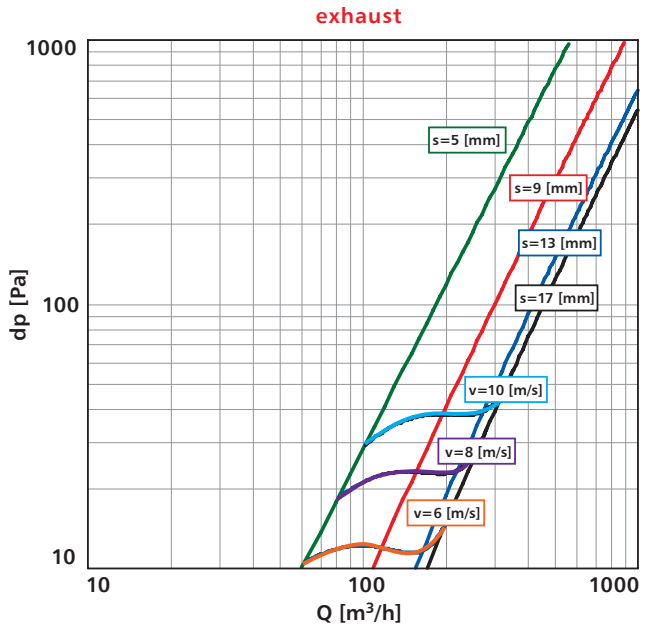
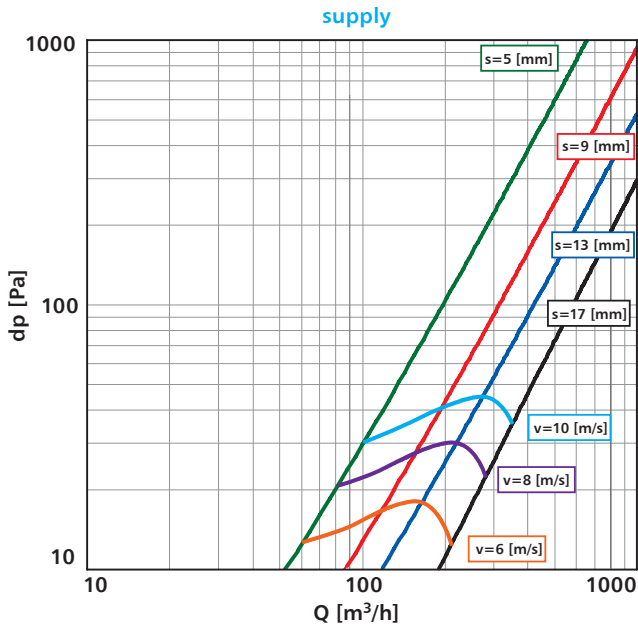
v – velocity [m/s]

Q – flow [m³/h]

» mcr ZIPP 160 flow characteristics



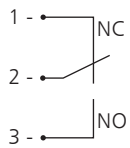
» mcr ZIPP 200 flow characteristics



8.7 | Trigger control mechanisms – specifications and connections diagram

execution type	RST	RST+WK1	RST+EKI24+WK1	RST+EKI230+WK1	RST+EKP24+WK1	RST+EKP240+WK1
thermal trigger	+	+	+	+	+	+
limit switch	-	250 V AC / 5A	250 V AC / 5A	250 V AC / 5A	250 V AC / 5A	250 V AC / 5A
rated voltage	-	-	24 V DC / pulse	230V AC / pulse	24 V DC / break	230V AC / break
power consumption	-	-	3.5 W	3.5 W	1.8 W	1.8 W

» electrical connections diagram for the mcr ZIPP RST+WK1 valve

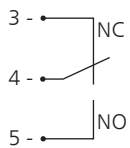


» electrical connections diagram for the mcr ZIPP RST+EKI valve or RST+EKP+WK1

»

1 - „+“

2 - „-“



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

8.8 | 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

8.9 | **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
RST+EKI230 – thermal trigger + “pulse” electromagnetic trigger, U = 230 V AC
RST+EKP24 – thermal trigger + “break” electromagnetic trigger, U = 24 V DC
RST+EKP230 – thermal trigger + “break” electromagnetic trigger, U = 230 V AC

2 - additional equipment:

- WK1 – limit switch (closed blade signal)
- RMK – extension stub
- T95 – thermal trigger for 95°C

NOTE: separate additional equipment entered with the “/” sign

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 + WK1
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.

Chapter 16 - power supply and control (p. 262) contains the following information:
- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper.



downloadable models
on the website
under the designer zone tab



- » **EIS60, ES120**
- » Fire resistance class: EI60 ($v_e i \leftrightarrow o$)S, E120 ($v_e i \leftrightarrow o$)S.
- » Certificate of constancy of performance 1396-CPR-0097.
- » Dampers certified for compliance with EN 15650.
- » Dampers qualified under EN 13501-3 and tested under EN 1366-2.
- » Narrow louvered cut-off dampers.

9.1 | Application

mcr WIP/S multi-blade cut-off dampers are designed for use in general ventilation systems, where those systems pass through construction partitions mcr WIP/S fire dampers are intended for use especially in systems, where the components such as a silencer, bend or supply and extract grille are installed downstream of the fire damper, as the partition does not protrude beyond the damper casing.

During a fire, they preserve the fire resistance rating of the construction partition that the ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and fire gasses to the remaining part of the building which is not on fire. During normal system operation, the louvers are open. In case of fire, the louver closes. Admissible flow velocity in the connected duct is 12 m/s.

In the version designed for explosion hazard zones (EX version), the dampers can be operated in gas explosion hazard zone 1 inside and outside ventilation ducts and in dust explosion hazard zone 21 outside these ducts. The dampers have been certified in compliance with the ATEX directive 94/9/EC and meet the requirements of group II category 2G and -/2D:

- » II 2G Ex h IIC T6 Gb
 - » II -/2D Ex h IIIC T72° -/Db
- Ambient temperature: T_a : -20° ... +50° C

9.2 | Design

casing

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

casing made
of non-flammable panels

louvers (damper blade)



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

The louver surface is covered with galvanized or stainless steel sheets. Each louver with a thickness of 15 mm is filled with a plaster board. The damper blades revolve on their own axes, which consist of two steel pins.

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 a square with a circular "bare end" connection.

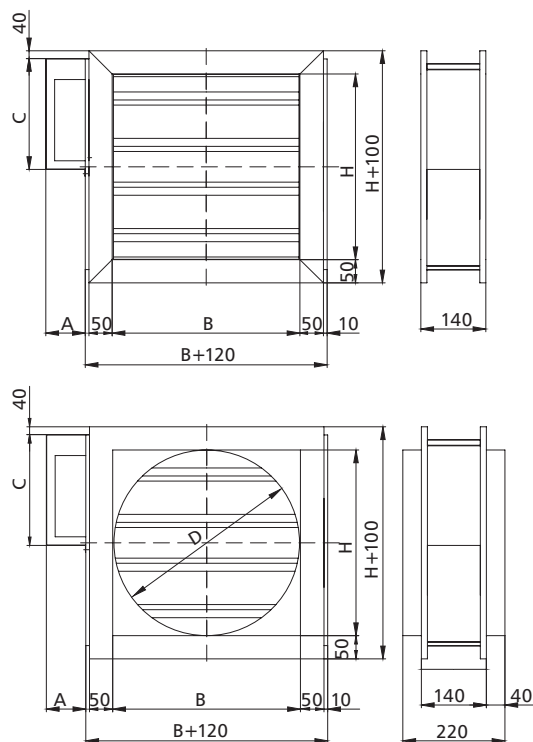
9.3 | Versions

9.3.1 | Damper closing and opening with an actuator

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

The mcr WIP/S dampers are equipped with a trigger control mechanism in the form of **BFL**, **BFN**, **BF**, **BF-TL**, **EXBF**, **MLF**, **MF** series axial actuator with a return spring, supplied with 24 V AC/DC or 230 V AC, with a 72°C thermoelectric trigger (optionally it is possible to use triggers with the nominal tripping temperature of 95°C). Actuators are equipped with limit switches used to monitor the position of the louver.

Dampers with actuators: analog **BFL**, **BFN**, **BF**, **MLF**, **MF**, digital **BF-TL**, **EXBF** explosion-proof actuators close as a result of the thermoelectric trigger tripping or power supply cut-off as a result of the actuator return spring action. The dampers open when power supply voltage is applied to the actuator terminals.



dimensions in [mm]

insert symmetrically against the wall axis

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

9.4 | Dimensions

Rectangular dampers:

- » nominal width B: from 120 mm to 1000 mm
- » nominal height H from 160 mm to 1000 mm
- » maximum single damper cross-section surface up to 1m².

Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges). The exception are dampers whose height value falls within the 36-54 ranges, e.g. 136-154, 236-254... Square dampers may also be additionally equipped with round connection collars allowing for so called "bare end" connection to round ducts.

9.5 | Installation

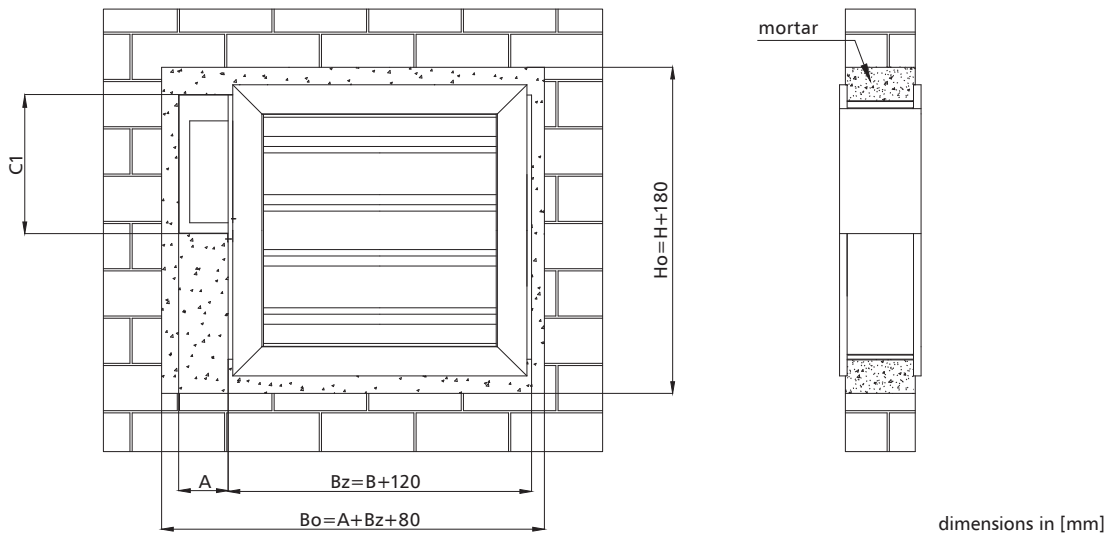
mcr WIP/S rectangular dampers are rated EI60(v_e i↔o)S and E120(v_e i↔o)S if installed in concrete partitions with a thickness of at least 120 mm, partitions made of full bricks or aerated concrete blocks with a thickness of at least 120 mm.

9.5.1 | Preparation of installation openings

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

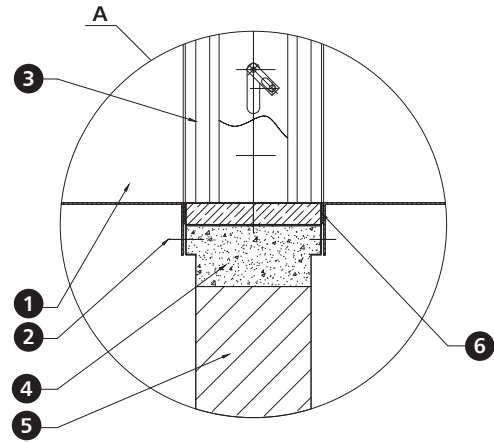
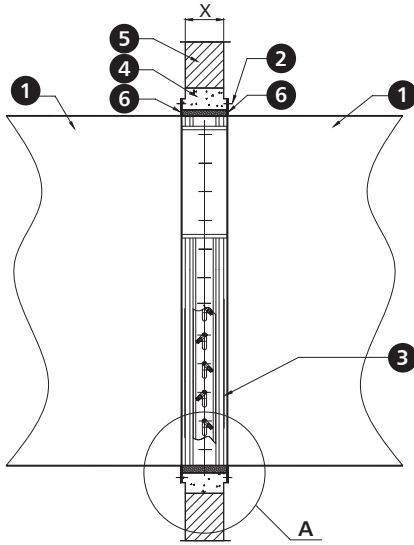
B_o = (A+Bz+80) mm

H_o = (H+180) mm



mechanism	BF	BFL	BFN	MF	MLF	EXBF
C1 [mm]	385	335	385	385	385	460
A [mm]	125	125	125	125	125	175

9.5.2 | Sample installation in concrete or masonry walls

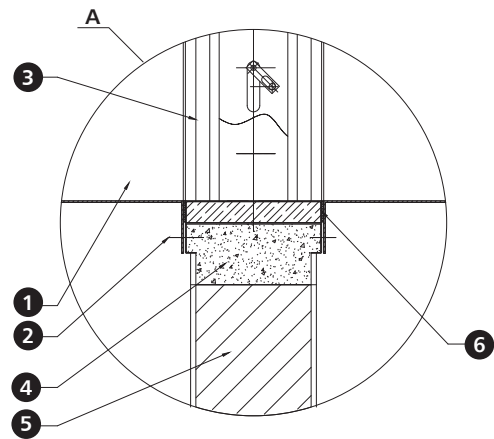
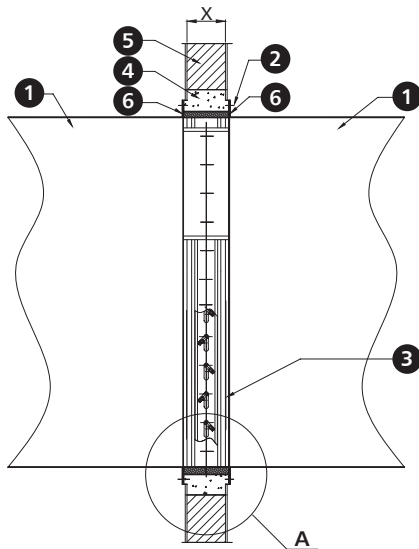


dimensions in [mm]

- | | | |
|---------------------------------|--|--------------------------|
| 1. ventilation duct | 4. sealing - e.g. cement masonry mortar* | 6. heat resistant gasket |
| 2. ST4.2 x 16 sheet metal screw | 5. masonry wall | X. wall thickness |
| 3. mcr WIP/S fire damper | | |

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

9.5.3 | Sample installation in concrete block or full brick walls

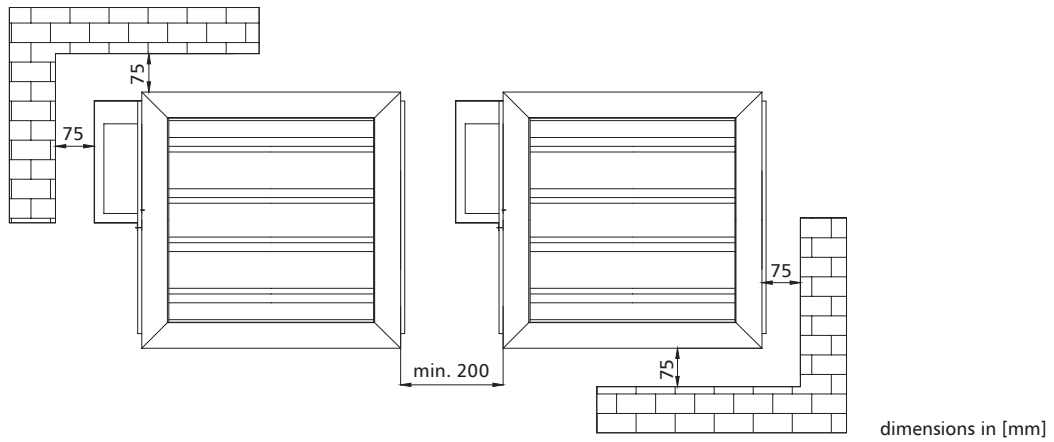


dimensions in [mm]

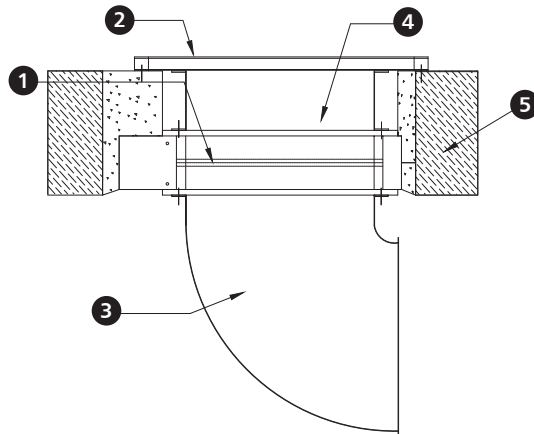
- | | | |
|---------------------------------|---|---------------------------|
| 1. ventilation duct | 4. .sealing - e.g. cement masonry mortar* | 6. .heat resistant gasket |
| 2. ST4.2 x 16 sheet metal screw | 5. wall of concrete blocks or full bricks | X. wall thickness |
| 3. mcr WIP/S fire damper | | |

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

» Distance between systems and partitions



» Example applications - installation with a masking element



- | | |
|--------------------------|---|
| 1. mcr WIP/S fire damper | 4. duct - ventilation straight connection piece |
| 2. masking element | 5. wall, floor slab |
| 3. ventilation duct | |

If a mcr WIP/S damper is used, the application of louvers (no single-blade design) it is possible to use the space in front of and behind the damper for such system elements as a masking element or a silencer with additional attenuation barrier or to route a duct along the wall using a duct bend or reduction.

9.6 | mcr WIP/S rectangular dampers technical parameters

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]																		
		200					250					300								
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [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	1 836	35	50
		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	2 295	35	51
		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	2 754	35	52
		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	29	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	3 213	34	52	
	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	3 672	34	53	
	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	4 131	34	54	
	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	4 590	33	54	
	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	5 049	34	54	
	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	5 508	33	54	
	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	5 967	33	55	
	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	6 426	33	55	
	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	6 885	32	55	
	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	7 344	32	55	
	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	7 803	31	55	
	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	8 262	31	55	
	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	9 180	31	56	
	10			6 120	32	54			7 650	32	55			9 180	31	56				

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		350					400					450					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	200	4			857	6	27			979	5	27			1 102	5	28
		6			1 285	13	38			1 469	12	38			1 652	12	38
		8	0.070	0.060	1 714	22	45	0.080	0.068	1 958	22	45	0.090	0.077	2 203	22	46
		10			2 142	35	51			2 448	34	51			2 754	34	52
	250	4			1 071	6	28			1 224	5	28			1 377	5	29
		6	0.088	0.074	1 607	13	39	0.100	0.085	1 836	12	39	0.113	0.096	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			1 285	6	29			1 469	5	29			1 652	5	30
		6	0.105	0.089	1 928	13	40	0.120	0.102	2 203	12	40	0.135	0.115	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			1 499	5	29			1 714	5	29			1 928	5	30	
	6	0.123	0.104	2 249	12	40	0.140	0.119	2 570	12	40	0.158	0.134	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			1 714	5	30			1 958	5	30			2 203	5	31	
	6	0.140	0.119	2 570	12	40	0.160	0.136	2 938	12	41	0.180	0.153	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			1 928	5	30			2 203	5	31			2 479	5	31	
	6	0.158	0.134	2 892	12	41	0.180	0.153	3 305	12	41	0.203	0.172	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			2 142	5	30			2 448	5	31			2 754	5	32	
	6	0.175	0.149	3 213	12	41	0.200	0.170	3 672	12	42	0.225	0.191	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			2 570	5	31			2 693	5	31			3 029	5	32	
	6	0.193	0.164	3 856	12	42	0.220	0.187	4 039	12	42	0.248	0.210	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			2 570	5	31			2 938	4	28			3 305	5	32	
	6	0.210	0.179	3 856	12	42	0.240	0.204	4 406	8	37	0.270	0.230	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			2 785	5	32			3 182	5	32			3 580	5	32	
	6	0.228	0.193	4 177	12	42	0.260	0.221	4 774	12	42	0.293	0.249	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			2 999	5	32			3 427	5	32			3 856	5	33	
	6	0.245	0.208	4 498	12	42	0.28	0.238	5 141	12	43	0.315	0.268	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			3 213	5	32			3 672	5	32			4 131	5	33	
	6	0.263	0.223	4 820	12	42	0.3	0.255	5 508	12	43	0.338	0.287	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			3 427	5	32			3 917	5	33			4 406	5	32	
	6	0.280	0.238	5 141	12	43	0.32	0.272	5 875	11	43	0.360	0.306	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			3 641	5	32			4 162	5	32			4 682	5	31	
	6	0.298	0.253	5 462	11	42	0.34	0.289	6 242	11	43	0.383	0.325	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			3 856	5	32			4 406	6	35			4 957	5	31	
	6	0.315	0.268	5 783	11	43	0.360	0.306	6 610	12	44	0.405	0.344	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			4 284	5	33			4 896	5	33			5 508	5	31	
	6	0.350	0.298	6 426	11	43	0.400	0.340	7 344	11	43	0.450	0.383	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	

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		500					550					600					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [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	

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		650					700					750					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [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	

mcr WIP/S | Multi-blade cut-off fire dampers for comfort ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]																				
		800					850					900					1000					
		v	S _k	S _e	Q	d _p	L _{WA}	S _k	S _e	Q	d _p	L _{WA}	S _k	S _e	Q	d _p	L _{WA}	S _k	S _e	Q	d _p	L _{WA}
[m/s]	[m ²]	[m ²]	[m ³ /s]	[Pa]	[dB]	[m ²]	[m ²]	[m ³ /s]	[Pa]	[dB]	[m ²]	[m ²]	[m ³ /s]	[Pa]	[dB]	[m ²]	[m ²]	[m ³ /s]	[Pa]	[dB]		
width B [mm]	200	4			1 958	5	29			2 081	5	29			2 203	5	29			2 448	5	29
		6	0.160	0.136	2 938	11	39	0.170	0.145	3 121	11	40	0.180	0.153	3 305	10	39	0.200	0.170	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			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	0.200	0.170	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			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	0.240	0.204	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			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	0.280	0.238	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			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	0.320	0.272	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			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	0.360	0.306	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			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	0.400	0.340	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			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	0.440	0.374	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			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	0.480	0.408	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			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	0.520	0.442	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			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	0.560	0.476	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			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	0.600	0.510	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			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	0.640	0.544	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			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	0.680	0.578	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			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	0.720	0.612	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			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	0.800	0.680	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/S fire damper selection program is available at www.mercor.com.pl, in the Designer Zone.

9.7 | Estimated weights of mcr WIP/S dampers for rectangular ventilation 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

9.8 | Accessories

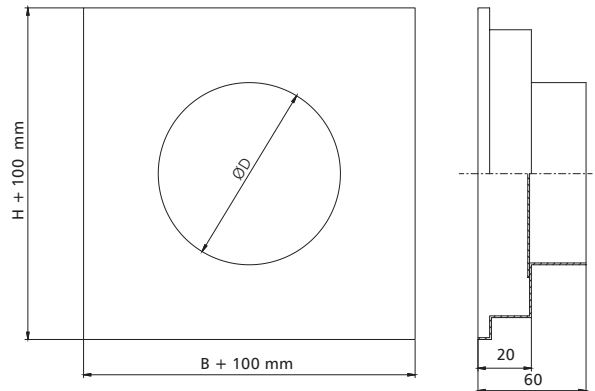
9.8.1 | mcr KRP connection stub

mcr KRP connection stubs are used to connect a circular ventilation duct to a rectangular damper. The connection is a „bare end“ pipe. The diameter of the stub pipe is 2 mm smaller than the diameter of the ventilation duct.

Dimensions:

BxH - damper dimensions [mm]

ØD - diameter of the connection duct [mm]



dimensions in [mm]

9.9 | Marking

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



1 - control:

» trigger and control mechanism – BF24-TN axial

- BF24-TN – actuator with a return spring, U = 24 V AC/DC
- BF230-TN – actuator with a return spring, U = 230 V AC
- BF24TL-TN-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-TN-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
- MF24T – actuator with a return spring, U = 24 V AC/DC
- MF230T – actuator with a return spring, U = 230 V AC
- MLF24T – actuator with a return spring, U = 24 V AC/DC
- MLF230T – actuator with a return spring, U = 230 V AC

2 - material

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

KN – stainless steel

KK – 1.4404 acid-proof steel

3 - additional parameters

» Thermoelectric and thermal triggers

[no symbol] – 72°C trigger

ZBAT95 – thermoelectric trigger for 95°C

T93-95 – thermal trigger for 95°C

T2-95 (MLF/MF) - thermal trigger for 95°C

» Damper axis of rotation

[no symbol] – horizontal axis of rotation

PP_D – vertical axis of rotation – mechanism at the bottom of the damper

PP_G – vertical axis of rotation - mechanism at the top of the damper

» Design standard

[no symbol] – left damper

KP – right damper

NOTE: separate additional parameters entered with the “/” sign

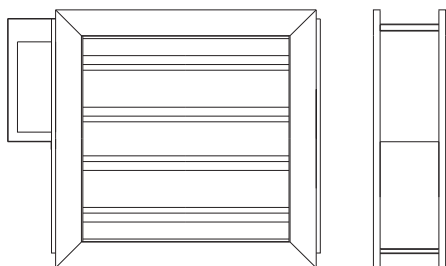
example marking:

mcr WIP/S 400 x 400 BFL24-T

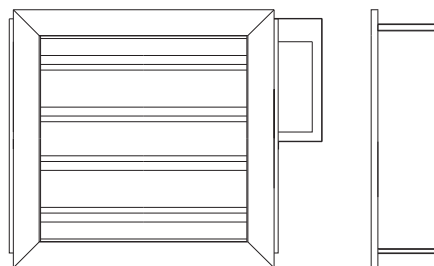
EIS60 louvered cut-off damper with a 24 V actuator with limit switches.

9.9.1 | Design standard

» left damper standard



» right damper



reverse installation possible

Chapter 16 - power supply and control (p. 262) contains the following information:
- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper.



downloadable models
on the website
under the designer zone tab



- » **EI120, E120**
- » Fire resistance class: EI120 ($v_e i \leftrightarrow o$), E120 ($v_e i \leftrightarrow o$).
- » Certificate of constancy of performance 1396-CPR-0097.
- » Dampers qualified under EN 13501-2, EN 13501-3 and tested under EN 1366-2.
- » Louvered transfer damper.
- » Installation with a horizontal and vertical rotation axis.

10.1 | Application

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

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

In the version designed for explosion hazard zones (EX version), the dampers can be operated in gas explosion hazard zone 1 inside and outside ventilation ducts and in dust explosion hazard zone 21 outside these ducts. The dampers have been certified in compliance with the ATEX directive 94/9/EC and meet the requirements of group II category 2G and -/2D:

- » II 2G Ex h IIC T6 Gb
 - » II -/2D Ex h IIC T72° -/Db
- Ambient temperature: Ta: -20° ... +50°C

10.2 | Design

casing

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

casing made
of non-flammable panels

louvers (damper blade)



mcr WIP/T transfer dampers consist of a casing with a rectangular cross section, a moving insulation blade in the form of multiple blades - louvers rotating on their axes and a trigger control mechanism which is tripped remotely or automatically by tripping a thermal trigger. The damper casing is made of galvanized steel sheets or stainless steel sheets. Its integral part is a flange made of boards with a fire resistance rating. The inner side of the fire damper casing is equipped with an intumescent gasket. The casing total length is 140 mm.

The louver surface is covered with galvanized or stainless steel sheets. Each louver with a thickness of 15 mm is filled with a plaster board. The damper blades revolve on their own axes, which consist of two steel pins. Transfer dampers must be protected with masking elements.

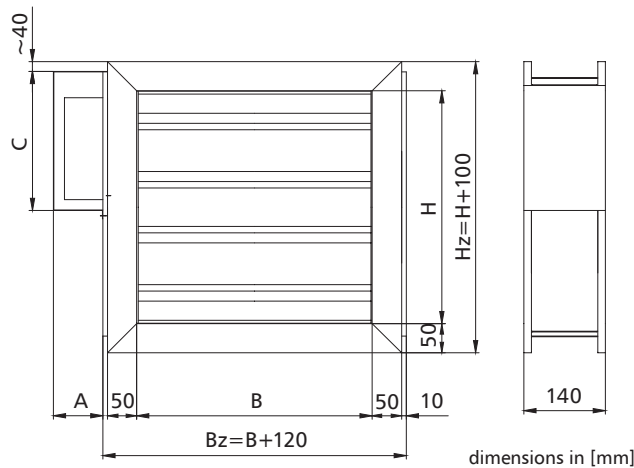
10.3 | Versions

10.3.1 | Damper closing and opening with an actuator

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

The mcr WIP/T dampers are equipped with a trigger control mechanism in the form of **BFL, BFN, BF, BF-TL, EXBF, MF, MLF** series axial actuator with a return spring, supplied with 24 V AC/DC or 230 V AC, with a 72°C thermoelectric trigger (optionally it is possible to use triggers with the nominal tripping temperature of 95°C).

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



mechanism	A	C
MF	385	125
MLF	385	125
BFN	125	325
BFL	125	275
BF	125	325
BF24TL-ST	125	325
EXBF	175	400

insert symmetrically against the wall axis

10.4 | Dimensions

» Rectangular dampers:

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

Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges). The exception are dampers whose height value falls within the 36-54 ranges, e.g. 136-154, 236-254...

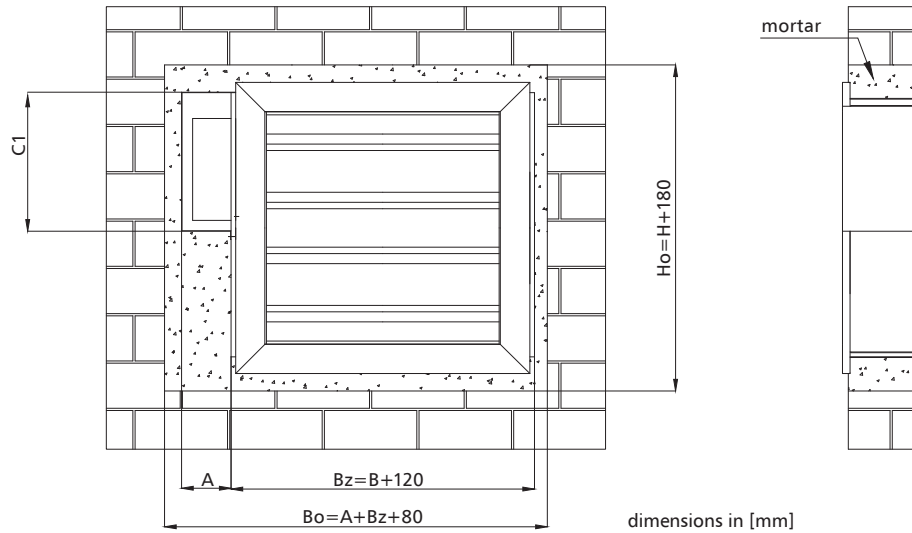
10.5 | Installation

mcr WIP/T rectangular dampers are rated EI120(v_e i↔o) / E120(v_e i↔o) if installed in concrete or reinforced concrete partitions with a thickness of at least 120 mm, partitions made of full bricks or concrete blocks with a thickness of at least 120 mm, masonry partitions made of perforated bricks or aerated concrete blocks with a thickness of at least 120 mm.

10.5.1 | Preparation of installation openings

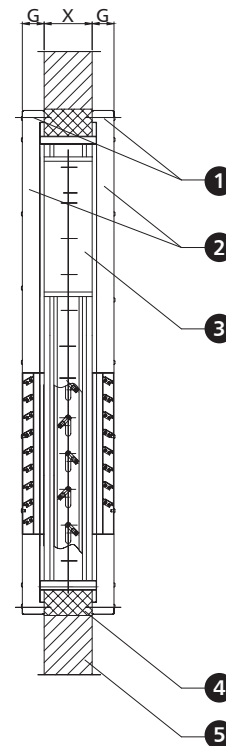
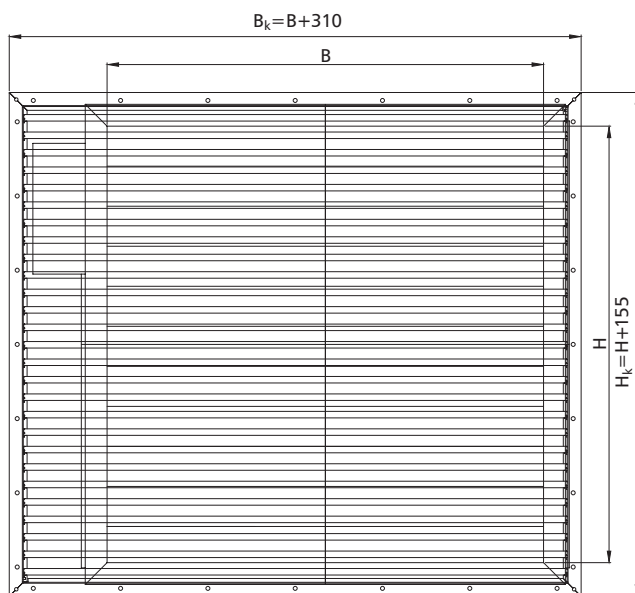
The minimum dimensions of the installation opening that permits correct installation of the mcr WIP/T damper is:

- Preferred
- $B_o = (A+Bz+80)$ mm
- $H_o = (H+180)$ mm



	BF	MF	MLF	BFL	BFN	EXBF
C1 [mm]	385	385	385	335	385	460
A [mm]	125	125	125	125	125	175

10.5.2 | Sample installation in concrete block or full brick walls



- 1. mounting pin
- 2. MST masking element
- 3. mcr WIP/T fire damper
- 4. e.g. cement mortar*
- 5. e.g. masonry wall

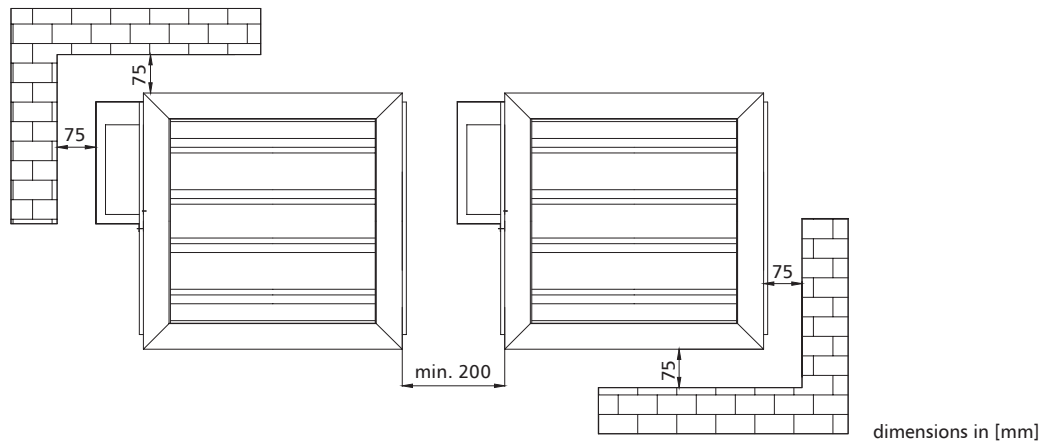
dimensions in [mm]

The thickness of the masking element "G" is 50 mm for wall thickness up to 120 mm. For walls thicker than 120 mm the manufacturer allows masking elements with a thickness of below 50 mm. For walls wider than the dampers' thickness, 30 mm masking elements may be used. The system masking element may be made of galvanized or stainless steel and painted in any RAL color (RAL 9010 as a standard).

» **Damper installation with a vertical louver rotation axis**

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

» **Distance between systems and partitions**



10.5.3 | MST system masking elements



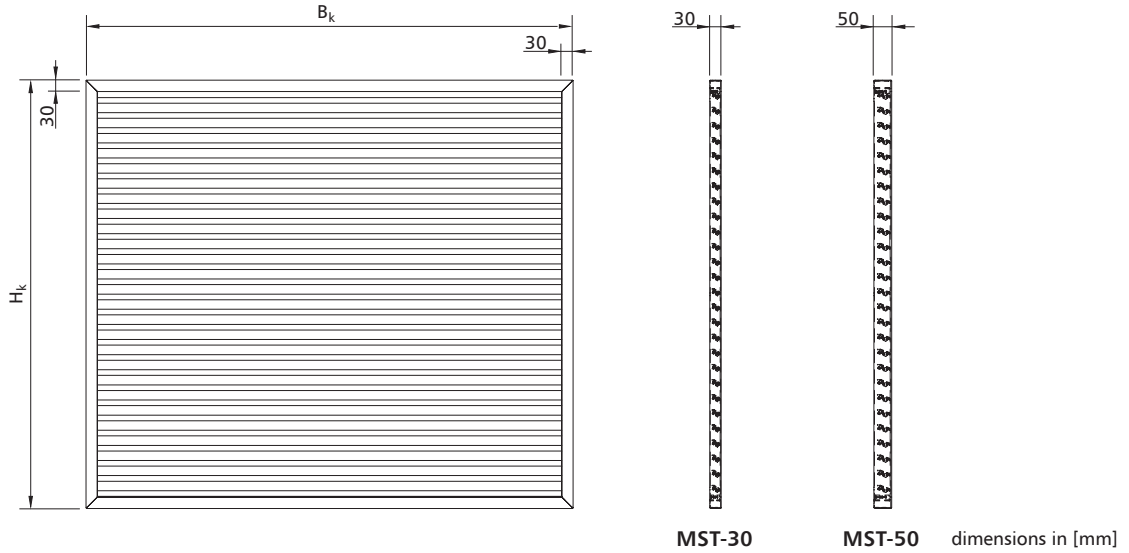
MST system masking elements are designed to fulfill either supply or exhaust function. They enable the transfer of air through construction partitions. They come with fixed steel louvers with a 40 mm span, obscuring damper visibility.

Bolts embedded in the body are used to attach the masking element body. After installation, an outer frame is mounted on the masking element body so that the holes and bolts cannot be seen from the outside. Such a solution allows for installing the product even in the most visually-demanding applications. The masking elements are painted in RAL 9010 as a standard (available in any colour from the RAL range on request).

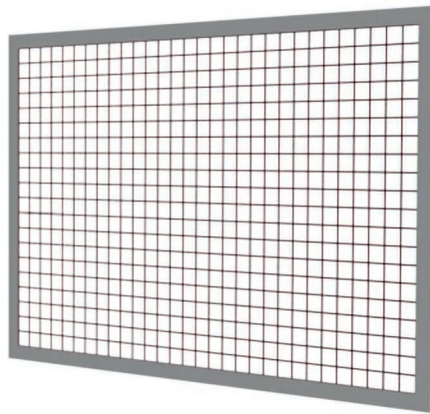
dimensions:

- » nominal width B_k : from 200 mm to 1500 mm
- » nominal height H_k from 200 mm to 1500 mm
- » nominal thickness G 30 and 50 mm

Apart from the standard dimensions, masking elements may be manufactured with intermediate dimensions.



10.5.4 | MWP mesh cover

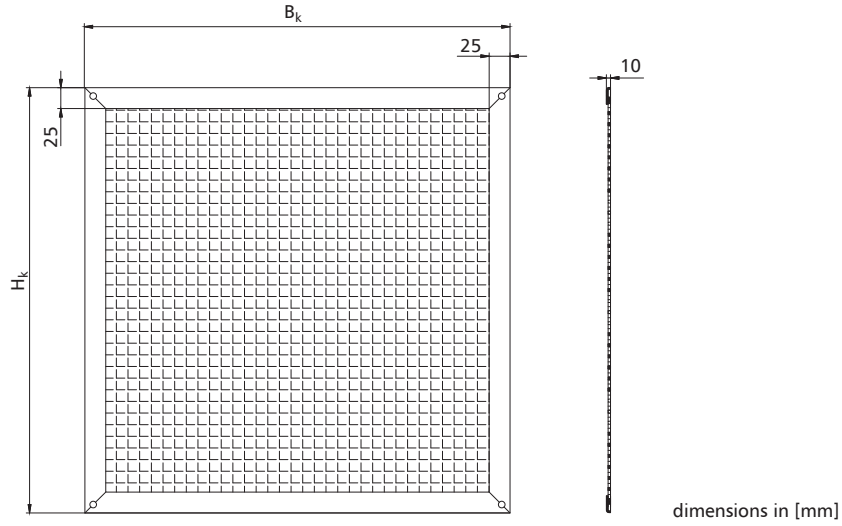


The MWP mesh cover may be supplied together with the damper by the damper manufacturer. System masking grilles, dedicated especially for commercial premises with high architectural and service requirements allows for covering the damper with any additional masking grille while fulfilling the fire rating requirements of the mcr WIP damper. With a wall thickness greater than 200 mm, system and non-system grilles can be applied directly to the wall.

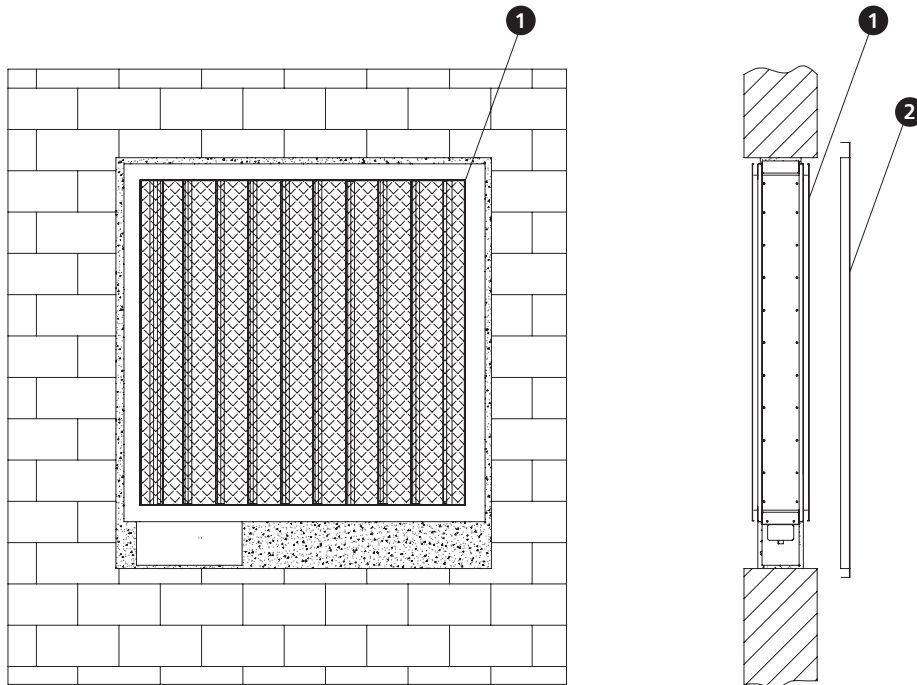
dimensions:

- » nominal width B_k : from 200 mm to 1100 mm
- » nominal height H_k from 200 mm to 1100 mm
- » nominal thickness 10 mm

Apart from the standard dimensions, masking elements may be manufactured with intermediate dimensions.



» sample installation



1. MWP mesh cover
2. decorative grille (any, e.g. as indicated by the architect)

10.5.5 | MST masking element technical parameters

B_k – nominal width [mm]
H_k – nominal height [mm]

v – velocity [m/s]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

		height H _k [mm]												
		200				300			400			500		
		v [m/s]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	S _e [m ²]	Q [m ³ /s]	d _p [PA]
width B _k [mm]	200	4	0.015	210	12	0.028	403	10	0.041	596	9	0.055	789	9
		6		315	27		605	23		894	21		1 184	20
		8		420	49		806	41		1 192	37		1 578	35
		10		526	76		1 008	64		1 490	58		1 973	54
	300	4	0.028	402	10	0.051	734	8	0.074	1 067	7	0.097	1 400	7
		6		603	23		1 102	19		1 601	17		2 100	15
		8		804	41		1 469	33		2 134	29		2 799	27
		10		1 004	64		1 836	52		2 668	46		3 499	42
	400	4	0.041	593	9	0.074	1 066	7	0.107	1 538	6	0.140	2 010	6
		6		890	21		1 598	17		2 307	14		3 015	13
		8		1 187	37		2 131	29		3 076	26		4 020	23
		10		1 483	58		2 664	46		3 845	40		5 026	36
	500	4	0.055	785	9	0.097	1 397	7	0.140	2 009	6	0.182	2 621	5
		6		1 177	20		2 095	15		3 013	13		3 931	12
		8		1 570	35		2 794	27		4 018	23		5 242	21
		10		1 962	55		3 492	42		5 022	36		6 552	33
	600	4	0.068	976	8	0.120	1 728	6	0.172	2 480	5	0.224	3 231	5
		6		1 464	19		2 592	14		3 720	12		4 847	11
		8		1 953	33		3 456	26		4 959	22		6 463	19
		10		2 441	52		4 320	40		6 199	34		8 078	30
	700	4	0.081	1 168	8	0.143	2 059	6	0.205	2 951	5	0.267	3 842	5
		6		1 752	18		3 089	14		4 426	12		5 763	10
		8		2 336	32		4 118	25		5 901	21		7 684	18
		10		2 920	50		5 148	38		7 376	32		9 605	29
	800	4	0.094	1 359	8	0.166	2 390	6	0.238	3 421	5	0.309	4 452	4
		6		2 039	18		3 586	13		5 132	11		6 679	10
		8		2 719	31		4 781	24		6 843	20		8 905	17
		10		3 398	49		5 976	37		8 554	31		11 131	27
	900	4	0.108	1 551	8	0.189	2 722	6	0.270	3 892	5	0.352	5 063	4
		6		2 326	17		4 082	13		5 838	11		7 595	9
		8		3 102	31		5 443	23		7 785	19		10 126	17
		10		3 877	48		6 804	36		9 731	30		12 658	26
	1000	4	0.121	1 742	8	0.212	3 053	6	0.303	4 363	5	0.394	5 674	4
		6		2 614	17		4 579	13		6 545	10		8 510	9
		8		3 485	30		6 106	23		8 726	19		11 347	16
		10		4 356	47		7 632	35		10 908	29		14 184	25
	1100	4	0.134	1 934	7	0.235	3 384	6	0.336	4 834	5	0.436	6 284	4
		6		2 901	17		5 076	12		7 251	10		9 426	9
		8		3 868	30		6 768	22		9 668	18		12 568	16
		10		4 835	47		8 460	35		12 085	28		15 710	25
	1200	4	0.148	2 125	7	0.258	3 715	5	0.368	5 305	4	0.479	6 895	4
		6		3 188	17		5 573	12		7 957	10		10 342	9
		8		4 251	30		7 430	22		10 610	18		13 789	16
		10		5 314	46		9 288	34		13 262	28		17 237	24
	1300	4	0.161	2 317	7	0.281	4 046	5	0.401	5 776	4	0.521	7 505	4
		6		3 475	16		6 070	12		8 664	10		11 258	9
		8		4 634	29		8 093	21		11 552	18		15 011	15
		10		5 792	46		10 116	34		14 440	27		18 763	24
1400	4	0.174	2 508	7	0.304	4 378	5	0.434	6 247	4	0.564	8 116	4	
	6		3 763	16		6 566	12		9 370	10		12 174	8	
	8		5 017	29		8 755	21		12 493	17		16 232	15	
	10		6 271	45		10 944	33		15 617	27		20 290	23	
1500	4	0.188	2 700	7	0.327	4 709	5	0.467	6 718	4	0.606	8 726	4	
	6		4 050	16		7 063	12		10 076	10		13 090	8	
	8		5 400	29		9 418	21		13 435	17		17 453	15	
	10		6 750	45		11 772	33		16 794	27		21 816	23	

B_k – nominal width [mm]
H_k – nominal height [mm]

v – velocity [m/s]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

		height H _k [mm]												
		600				700			800			900		
		v [m/s]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]
width B _k [mm]	200	4	0.068	982	8	0.082	1 175	8	0.095	1 368	8	0.108	1 558	8
		6		1 473	19		1 763	18		2 052	18		2 337	17
		8		1 964	33		2 350	32		2 736	31		3 116	31
		10		2 455	52		2 938	50		3 420	49		3 895	48
	300	4	0.120	1 732	6	0.143	2 065	6	0.167	2 398	6	0.189	2 726	6
		6		2 598	14		3 097	14		3 596	13		4 089	13
		8		3 465	25		4 130	24		4 795	24		5 452	23
		10		4 331	40		5 162	38		5 994	37		6 815	36
	400	4	0.172	2 483	5	0.205	2 955	5	0.238	3 427	5	0.270	3 894	5
		6		3 724	12		4 432	12		5 141	11		5 841	11
		8		4 965	22		5 910	21		6 854	20		7 788	19
		10		6 206	34		7 387	32		8 568	31		9 734	30
500	4	0.225	3 233	5	0.267	3 845	5	0.310	4 457	4	0.352	5 062	4	
	6		4 849	11		5 767	10		6 685	10		7 592	9	
	8		6 466	19		7 690	18		8 914	17		10 123	17	
	10		8 082	30		9 612	28		11 142	27		12 654	26	
600	4	0.277	3 983	4	0.329	4 735	4	0.381	5 486	4	0.433	6 229	4	
	6		5 975	10		7 102	9		8 230	9		9 344	9	
	8		7 966	18		9 469	17		10 973	16		12 459	15	
	10		9 958	28		11 837	26		13 716	25		15 574	24	
700	4	0.329	4 733	4	0.391	5 625	4	0.453	6 516	4	0.514	7 397	4	
	6		7 100	9		8 437	9		9 774	8		11 096	8	
	8		9 467	17		11 249	16		13 032	15		14 795	14	
	10		11 833	26		14 062	24		16 290	23		18 493	22	
800	4	0.381	5 484	4	0.452	6 515	4	0.524	7 546	3	0.595	8 565	3	
	6		8 225	9		9 772	8		11 318	8		12 848	8	
	8		10 967	16		13 029	15		15 091	14		17 130	13	
	10		13 709	25		16 286	23		18 864	22		21 413	21	
900	4	0.433	6 234	4	0.514	7 404	4	0.596	8 575	3	0.676	9 733	3	
	6		9 351	9		11 107	8		12 863	7		14 599	7	
	8		12 468	15		14 809	14		17 150	13		19 466	13	
	10		15 584	24		18 511	22		21 438	21		24 332	20	
1000	4	0.485	6 984	4	0.576	8 294	3	0.667	9 605	3	0.757	10 901	3	
	6		10 476	8		12 442	8		14 407	7		16 351	7	
	8		13 968	15		16 589	14		19 210	13		21 802	12	
	10		17 460	23		20 736	21		24 012	20		27 252	19	
1100	4	0.537	7 734	4	0.638	9 184	3	0.739	10 634	3	0.838	12 069	3	
	6		11 601	8		13 776	7		15 952	7		18 103	7	
	8		15 468	14		18 369	13		21 269	12		24 137	12	
	10		19 336	22		22 961	21		26 586	19		30 172	18	
1200	4	0.589	8 484	3	0.700	10 074	3	0.810	11 664	3	0.919	13 236	3	
	6		12 727	8		15 111	7		17 496	7		19 855	6	
	8		16 969	14		20 148	13		23 328	12		26 473	11	
	10		21 211	22		25 186	20		29 160	19		33 091	18	
1300	4	0.641	9 235	3	0.761	10 964	3	0.882	12 694	3	1.000	14 404	3	
	6		13 852	8		16 446	7		19 040	7		21 606	6	
	8		18 469	14		21 928	13		25 387	12		28 809	11	
	10		23 087	21		27 410	20		31 734	18		36 011	17	
1400	4	0.693	9 985	3	0.823	11 854	3	0.953	13 723	3	1.081	15 572	3	
	6		14 977	8		17 781	7		20 585	6		23 358	6	
	8		19 970	13		23 708	12		27 446	11		31 144	11	
	10		24 962	21		29 635	19		34 308	18		38 930	17	
1500	4	0.746	10 735	3	0.885	12 744	3	1.025	14 753	3	1.163	16 740	3	
	6		16 103	7		19 116	7		22 129	6		25 110	6	
	8		21 470	13		25 488	12		29 506	11		33 480	11	
	10		26 838	21		31 860	19		36 882	18		41 850	17	

B_k – nominal width [mm]
H_k – nominal height [mm]

v – velocity [m/s]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

		height H _k [mm]															
		1000				1100				1200				1300			
		v [m/s]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]			
width B _k [mm]	200	4	0.122	1 751	8	0.135	1 944	7	0.148	2 137	7	0.162	2 330	7			
		6		2 627	17		2 916	17		3 205	16		3 495	16			
		8		3 502	30		3 888	30		4 274	29		4 660	29			
		10		4 378	47		4 860	46		5 342	46		5 825	45			
	300	4	0.212	3 059	6	0.236	3 391	5	0.259	3 724	5	0.282	4 056	5			
		6		4 588	13		5 087	12		5 586	12		6 085	12			
		8		6 117	22		6 782	22		7 448	22		8 113	21			
		10		7 646	35		8 478	34		9 310	34		10 141	33			
	400	4	0.303	4 366	5	0.336	4 838	5	0.369	5 311	4	0.402	5 783	4			
		6		6 549	10		7 258	10		7 966	10		8 675	10			
		8		8 732	19		9 677	18		10 621	18		11 566	17			
		10		10 915	29		12 096	28		13 277	28		14 458	27			
	500	4	0.394	5 674	4	0.437	6 286	4	0.479	6 898	4	0.522	7 510	4			
		6		8 510	9		9 428	9		10 346	9		11 264	9			
		8		11 347	16		12 571	16		13 795	15		15 019	15			
		10		14 184	25		15 714	25		17 244	24		18 774	24			
	600	4	0.485	6 981	4	0.537	7 733	4	0.589	8 484	3	0.641	9 236	3			
		6		10 472	8		11 599	8		12 727	8		13 854	8			
		8		13 962	15		15 466	14		16 969	14		18 472	14			
		10		17 453	23		19 332	22		21 211	22		23 090	21			
	700	4	0.576	8 289	3	0.638	9 180	3	0.699	10 071	3	0.761	10 963	3			
		6		12 433	8		13 770	7		15 107	7		16 444	7			
		8		16 577	14		18 360	13		20 143	13		21 925	13			
		10		20 722	21		22 950	21		25 178	20		27 407	20			
	800	4	0.666	9 596	3	0.738	10 627	3	0.810	11 658	3	0.881	12 689	3			
		6		14 394	7		15 941	7		17 487	7		19 034	7			
		8		19 192	13		21 254	12		23 316	12		25 379	12			
		10		23 990	20		26 568	19		29 146	19		31 723	18			
	900	4	0.757	10 904	3	0.839	12 074	3	0.920	13 245	3	1.001	14 416	3			
		6		16 356	7		18 112	7		19 868	6		21 624	6			
		8		21 807	12		24 149	12		26 490	11		28 832	11			
		10		27 259	19		30 186	18		33 113	18		36 040	17			
	1000	4	0.848	12 211	3	0.939	13 522	3	1.030	14 832	3	1.121	16 142	3			
		6		18 317	7		20 282	6		22 248	6		24 214	6			
		8		24 422	12		27 043	11		29 664	11		32 285	11			
		10		30 528	18		33 804	18		37 080	17		40 356	17			
	1100	4	0.939	13 519	3	1.040	14 969	3	1.140	16 419	3	1.241	17 869	3			
		6		20 278	6		22 453	6		24 628	6		26 803	6			
		8		27 037	11		29 938	11		32 838	10		35 738	10			
		10		33 797	18		37 422	17		41 047	16		44 672	16			
	1200	4	1.030	14 826	3	1.140	16 416	3	1.250	18 006	3	1.361	19 596	2			
		6		22 239	6		24 624	6		27 009	6		29 393	6			
		8		29 652	11		32 832	10		36 012	10		39 191	10			
		10		37 066	17		41 040	16		45 014	16		48 989	15			
	1300	4	1.120	16 134	3	1.241	17 863	3	1.361	19 593	2	1.481	21 322	2			
		6		24 201	6		26 795	6		29 389	6		31 983	5			
		8		32 268	11		35 726	10		39 185	10		42 644	10			
		10		40 334	17		44 658	16		48 982	15		53 305	15			
1400	4	1.211	17 441	3	1.341	19 310	2	1.471	21 180	2	1.601	23 049	2				
	6		26 162	6		28 966	6		31 769	5		34 573	5				
	8		34 883	10		38 621	10		42 359	10		46 097	9				
	10		43 603	16		48 276	16		52 949	15		57 622	14				
1500	4	1.302	18 749	3	1.442	20 758	2	1.581	22 766	2	1.721	24 775	2				
	6		28 123	6		31 136	5		34 150	5		37 163	5				
	8		37 498	10		41 515	10		45 533	9		49 550	9				
	10		46 872	16		51 894	15		56 916	15		61 938	14				

B_k – nominal width [mm]
 H_k – nominal height [mm]

v – velocity [m/s]
 S_e – damper active cross-section [m²]

Q – flow [m³/h]
 d_p – pressure drop [Pa]

		height H_k [mm]						
		1400			1500			
		v [m/s]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]
width B_k [mm]	200	4	0.175	2 523	7	0.189	2 716	7
		6		3 784	16		4 074	16
		8		5 046	29		5 432	29
		10		6 307	45		6 790	45
	300	4	0.305	4 389	5	0.328	4 722	5
		6		6 584	12		7 083	12
		8		8 778	21		9 444	21
		10		10 973	33		11 804	33
	400	4	0.434	6 255	4	0.467	6 728	4
		6		9 383	10		10 092	10
		8		12 511	17		13 455	17
		10		15 638	27		16 819	27
	500	4	0.564	8 122	4	0.607	8 734	4
		6		12 182	8		13 100	8
		8		16 243	15		17 467	15
		10		20 304	23		21 834	23
	600	4	0.694	9 988	3	0.746	10 740	3
		6		14 982	8		16 109	7
		8		19 976	13		21 479	13
		10		24 970	21		26 849	21
700	4	0.823	11 854	3	0.885	12 745	3	
	6		17 781	7		19 118	7	
	8		23 708	12		25 491	12	
	10		29 635	19		31 864	19	
800	4	0.953	13 720	3	1.024	14 751	3	
	6		20 580	6		22 127	6	
	8		27 441	11		29 503	11	
	10		34 301	18		36 878	18	
900	4	1.082	15 587	3	1.164	16 757	3	
	6		23 380	6		25 136	6	
	8		31 173	11		33 515	11	
	10		38 966	17		41 893	17	
1000	4	1.212	17 453	3	1.303	18 763	3	
	6		26 179	6		28 145	6	
	8		34 906	10		37 526	10	
	10		43 632	16		46 908	16	
1100	4	1.342	19 319	2	1.442	20 769	2	
	6		28 979	6		31 154	5	
	8		38 638	10		41 538	10	
	10		48 298	15		51 923	15	
1200	4	1.471	21 185	2	1.582	22 775	2	
	6		31 778	5		34 163	5	
	8		42 371	10		45 550	9	
	10		52 963	15		56 938	15	
1300	4	1.601	23 052	2	1.721	24 781	2	
	6		34 577	5		37 171	5	
	8		46 103	9		49 562	9	
	10		57 629	14		61 952	14	
1400	4	1.730	24 918	2	1.860	26 787	2	
	6		37 377	5		40 180	5	
	8		49 836	9		53 574	9	
	10		62 294	14		66 967	14	
1500	4	1.860	26 784	2	2.000	28 793	2	
	6		40 176	5		43 189	5	
	8		53 568	9		57 586	9	
	10		66 960	14		71 982	13	

10.6 | mcr WIP/T rectangular dampers technical parameters

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]																		
		200					250					300								
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [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	1 836	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	2 295	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	2 754	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	29	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	3 213	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	3 672	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	4 131	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	4 590	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	5 049	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	5 508	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	5 967	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	6 426	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	6 885	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	7 344	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	7 803	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	8 262	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	9 180	20	50	
	10			6 120	32	54			7 650	32	55			9 180	31	56				

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		350					400					450					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [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 <td>4</td> <td rowspan="4">0.088</td> <td rowspan="4">0.074</td> <td>1 071</td> <td>6</td> <td>28</td> <td rowspan="4">0.100</td> <td rowspan="4">0.085</td> <td>1 224</td> <td>5</td> <td>28</td> <td rowspan="4">0.113</td> <td rowspan="4">0.096</td> <td>1 377</td> <td>5</td> <td>29</td>	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 <td>4</td> <td rowspan="4">0.105</td> <td rowspan="4">0.089</td> <td>1 285</td> <td>6</td> <td>29</td> <td rowspan="4">0.120</td> <td rowspan="4">0.102</td> <td>1 469</td> <td>5</td> <td>29</td> <td rowspan="4">0.135</td> <td rowspan="4">0.115</td> <td>1 652</td> <td>5</td> <td>30</td>	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 <td>4</td> <td rowspan="4">0.123</td> <td rowspan="4">0.104</td> <td>1 499</td> <td>5</td> <td>29</td> <td rowspan="4">0.140</td> <td rowspan="4">0.119</td> <td>1 714</td> <td>5</td> <td>29</td> <td rowspan="4">0.158</td> <td rowspan="4">0.134</td> <td>1 928</td> <td>5</td> <td>30</td>	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 <td>4</td> <td rowspan="4">0.140</td> <td rowspan="4">0.119</td> <td>1 714</td> <td>5</td> <td>30</td> <td rowspan="4">0.160</td> <td rowspan="4">0.136</td> <td>1 958</td> <td>5</td> <td>30</td> <td rowspan="4">0.180</td> <td rowspan="4">0.153</td> <td>2 203</td> <td>5</td> <td>31</td>	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 <td>4</td> <td rowspan="4">0.158</td> <td rowspan="4">0.134</td> <td>1 928</td> <td>5</td> <td>30</td> <td rowspan="4">0.180</td> <td rowspan="4">0.153</td> <td>2 203</td> <td>5</td> <td>31</td> <td rowspan="4">0.203</td> <td rowspan="4">0.172</td> <td>2 479</td> <td>5</td> <td>31</td>	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 <td>4</td> <td rowspan="4">0.175</td> <td rowspan="4">0.149</td> <td>2 142</td> <td>5</td> <td>30</td> <td rowspan="4">0.200</td> <td rowspan="4">0.170</td> <td>2 448</td> <td>5</td> <td>31</td> <td rowspan="4">0.225</td> <td rowspan="4">0.191</td> <td>2 754</td> <td>5</td> <td>32</td>	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 <td>4</td> <td rowspan="4">0.193</td> <td rowspan="4">0.164</td> <td>2 570</td> <td>5</td> <td>31</td> <td rowspan="4">0.220</td> <td rowspan="4">0.187</td> <td>2 693</td> <td>5</td> <td>31</td> <td rowspan="4">0.248</td> <td rowspan="4">0.210</td> <td>3 029</td> <td>5</td> <td>32</td>	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 <td>4</td> <td rowspan="4">0.210</td> <td rowspan="4">0.179</td> <td>2 570</td> <td>5</td> <td>31</td> <td rowspan="4">0.240</td> <td rowspan="4">0.204</td> <td>2 938</td> <td>4</td> <td>28</td> <td rowspan="4">0.270</td> <td rowspan="4">0.230</td> <td>3 305</td> <td>5</td> <td>32</td>	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 <td>4</td> <td rowspan="4">0.228</td> <td rowspan="4">0.193</td> <td>2 785</td> <td>5</td> <td>32</td> <td rowspan="4">0.260</td> <td rowspan="4">0.221</td> <td>3 182</td> <td>5</td> <td>32</td> <td rowspan="4">0.293</td> <td rowspan="4">0.249</td> <td>3 580</td> <td>5</td> <td>32</td>	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 <td>4</td> <td rowspan="4">0.245</td> <td rowspan="4">0.208</td> <td>2 999</td> <td>5</td> <td>32</td> <td rowspan="4">0.28</td> <td rowspan="4">0.238</td> <td>3 427</td> <td>5</td> <td>32</td> <td rowspan="4">0.315</td> <td rowspan="4">0.268</td> <td>3 856</td> <td>5</td> <td>33</td>	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 <td>4</td> <td rowspan="4">0.263</td> <td rowspan="4">0.223</td> <td>3 213</td> <td>5</td> <td>32</td> <td rowspan="4">0.3</td> <td rowspan="4">0.255</td> <td>3 672</td> <td>5</td> <td>32</td> <td rowspan="4">0.338</td> <td rowspan="4">0.287</td> <td>4 131</td> <td>5</td> <td>33</td>	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 <td>4</td> <td rowspan="4">0.280</td> <td rowspan="4">0.238</td> <td>3 427</td> <td>5</td> <td>32</td> <td rowspan="4">0.32</td> <td rowspan="4">0.272</td> <td>3 917</td> <td>5</td> <td>33</td> <td rowspan="4">0.360</td> <td rowspan="4">0.306</td> <td>4 406</td> <td>5</td> <td>32</td>	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 <td>4</td> <td rowspan="4">0.298</td> <td rowspan="4">0.253</td> <td>3 641</td> <td>5</td> <td>32</td> <td rowspan="4">0.34</td> <td rowspan="4">0.289</td> <td>4 162</td> <td>5</td> <td>32</td> <td rowspan="4">0.383</td> <td rowspan="4">0.325</td> <td>4 682</td> <td>5</td> <td>31</td>	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 <td>4</td> <td rowspan="4">0.315</td> <td rowspan="4">0.268</td> <td>3 856</td> <td>5</td> <td>32</td> <td rowspan="4">0.360</td> <td rowspan="4">0.306</td> <td>4 406</td> <td>6</td> <td>35</td> <td rowspan="4">0.405</td> <td rowspan="4">0.344</td> <td>4 957</td> <td>5</td> <td>31</td>	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 <td>4</td> <td rowspan="4">0.350</td> <td rowspan="4">0.298</td> <td>4 284</td> <td>5</td> <td>33</td> <td rowspan="4">0.400</td> <td rowspan="4">0.340</td> <td>4 896</td> <td>5</td> <td>33</td> <td rowspan="4">0.450</td> <td rowspan="4">0.383</td> <td>5 508</td> <td>5</td> <td>31</td>	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		

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		500					550					600					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [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	

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		650					700					750					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [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	

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

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

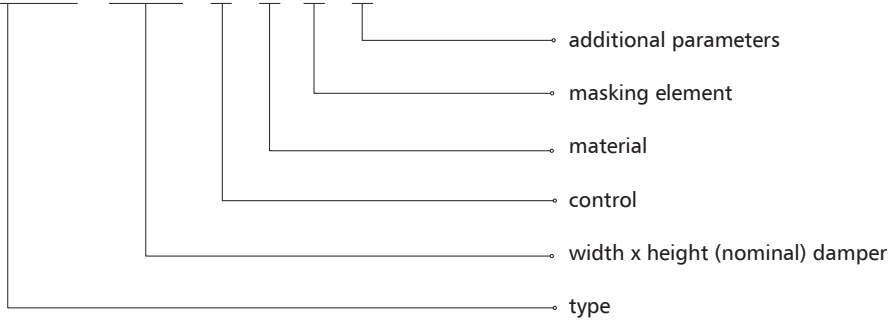
The mcr WIP/T fire damper selection program is available at www.mercor.com.pl, in the Designer Zone.

10.7 | Estimated weights of mcr WIP/T 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	

10.8 | Marking

mcr WIP/T / B x H / 1 / 2 / 3 / 4



1 - control:

» trigger control mechanism

- BF24-TN – actuator with a return spring, U = 24 V AC/DC
- BF230-TN – actuator with a return spring, U = 230 V AC
- BF24TL-TN-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-TN-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
- MF24T – actuator with a return spring, U = 24 V AC/DC
- MF230T – actuator with a return spring, U = 230 V AC
- MLF24T – actuator with a return spring, U = 24 V AC/DC
- MLF230T – actuator with a return spring, U = 230 V AC

2 - material:

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

3 - masking element:

- MSTx1 – single masking element
- MSTx2 – double masking element
- MWPx1 – single mesh cover
- MWPx2 – double mesh cover

4 - additional parameters :

» **Thermoelectric and thermal triggers**

- [no symbol] – 72°C trigger
- ZBAT95 – thermoelectric trigger for 95°C
- T93-95 – thermal trigger for 95°C
- T2-95 (MLF / MF) – thermal trigger for 95°C

» **Damper axis of rotation**

- [no symbol] – horizontal axis of rotation
- PP_D – vertical axis of rotation – mechanism at the bottom of the damper
- PP_G – vertical axis of rotation - mechanism at the top of the damper

» **Design standard**

- [no symbol] – left damper
- KO – inverted damper

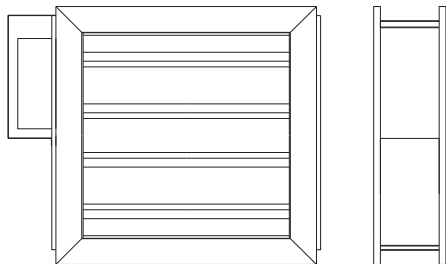
NOTE: separate additional parameters entered with the “/” sign

example marking:

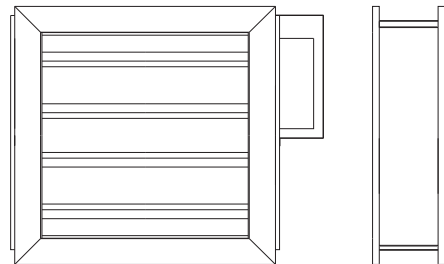
mcr WIP/T 400 x 400 BFL24-T
E1120 louvered transfer damper with a 24 V actuator with limit switches.

10.8.1 | Design standard

» **left damper standard**



» **right damper**



Chapter 16 - power supply and control (p. 262) contains the following information:
- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper.

mcr WIP/V, mcr WIP/V-M | Multi-blade smoke control damper for multi-compartment fire ventilation systems



downloadable models
on the website
under the designer zone tab

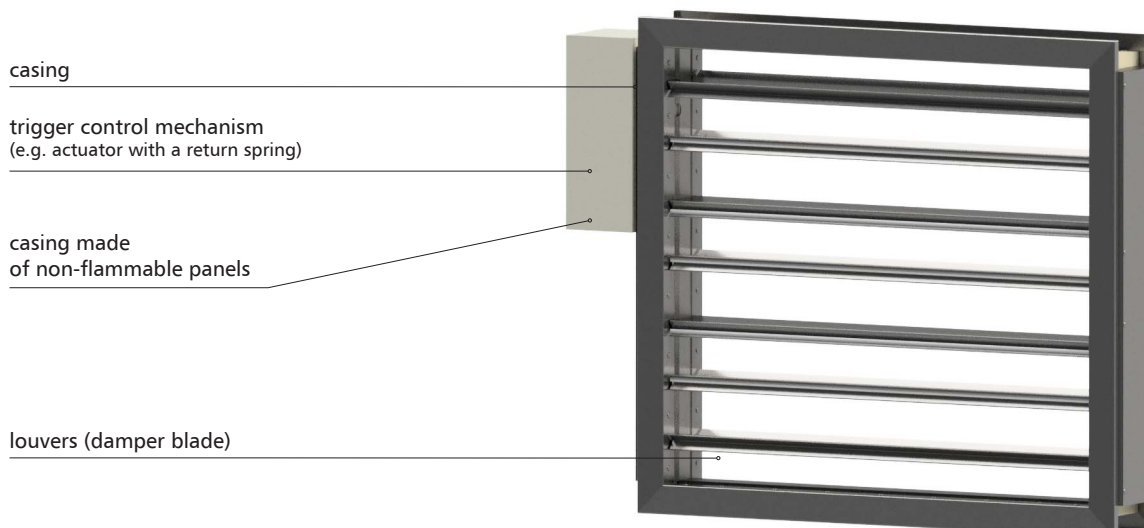


- » **EI120**
- » Fire resistance class: EI120 (v_{ew} $i \leftrightarrow o$)1000C₁₀₀₀₀AAmulti, E₆₀₀120 (v_e $i \leftrightarrow o$)1000C₁₀₀₀₀AAsingle.
- » Certificate of constancy of performance 1396-CPR-0117.
- » Dampers certified for compliance with EN 12101-8.
- » Dampers rated under EN 13501-4 and tested under EN 1366-10.
- » Narrow louvered smoke control dampers for fire ventilation systems.

11.1| Application

mcr WIP/V, mcr WIP/V-M multi-blade smoke control dampers are intended for installation in automatically operated fire ventilation systems. mcr WIP/V dampers are used in fire ventilation systems, while dampers marked as mcr WIP/V-M are used in mixed, fire and comfort ventilation systems. When installed, these devices prevent the propagation of fire, smoke and fire gases to adjacent areas. During normal operation, the fire damper blade is in the open or closed position, depending on its function. The fire damper blade in the fire compartment is opened, whereas in other areas the blades are closed. Admissible flow velocity in the connected duct is 15 m/s. Due to their design, mcr WIP/V, mcr WIP/V-M smoke control dampers are intended for use in systems, where the components such as a silencer, bend or supply and extraction grille are installed downstream of the smoke control damper.

11.2| Design



mcr WIP/V, mcr WIP/V-M | Multi-blade smoke control damper for multi-compartment fire ventilation systems

mcr WIP/V, mcr WIP/V-M smoke control dampers consist of a casing with a rectangular cross-section, multiple moving damper blades – louvers rotating around their own axes – and a remotely activated trigger and control mechanism. The damper casing is made of galvanized steel sheets or stainless steel sheets. Its integral part is a flange made of boards with a fire resistance rating. The inner side of the fire damper casing is equipped with an intumescent gasket and ventilation gaskets to ensure air tightness. The damper casing total length is 140 mm.

The louver surface (blades) is covered with galvanized or stainless steel sheets. Each louver with a thickness of 15 mm is filled with a plaster board. The damper blades revolve on their own 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 a square with a circular “bare end” connection.

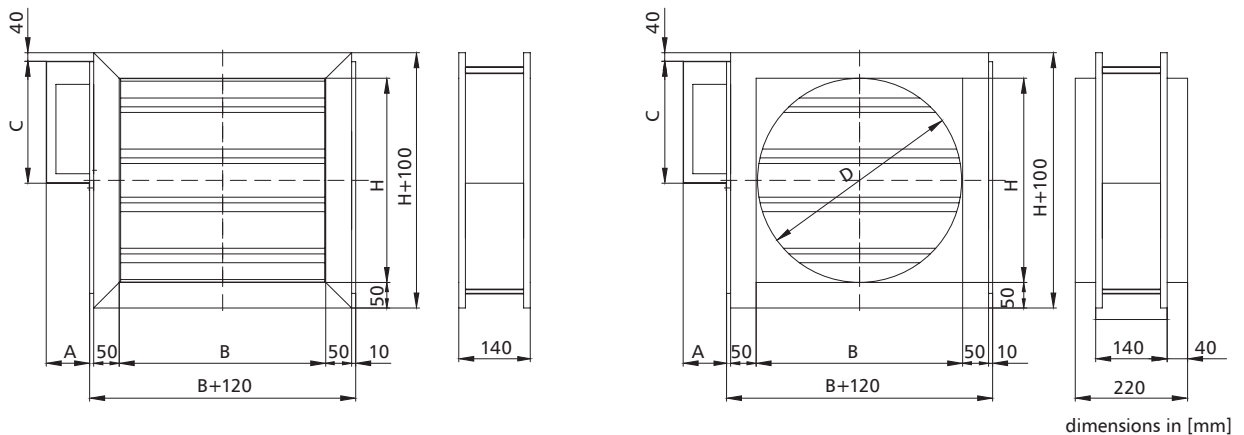
11.3 | Versions

11.3.1 | Damper closing and opening with an actuator

During normal operation, the smoke control dampers are opened or closed. In case of fire, the fire damper louvers are opened in the fire compartment 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 trigger control mechanism in the form of a BEE, BEN, BE axial actuator without the return spring (24 V AC/DC or 230 V AC). The BE, BEE, BEN series actuators are equipped with limit switches used to monitor the damper blade position. Furthermore, a mechanical position indicator is placed on the actuator.

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



mechanism	A	C
BEN	125	275
BEE	125	325
BE	125	325

insert symmetrically against the wall axis

11.4 | Dimensions

» Rectangular dampers:

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

Apart from the standard dimensions, smoke control damper may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges). The exception are dampers whose height value falls within the 36-54 ranges, e.g. 136-154, 236-254...

Square dampers may also be additionally equipped with round connection collars allowing for so called “bare end” connection to round ducts.

mcr WIP/V, mcr WIP/V-M | Multi-blade smoke control damper for multi-compartment fire ventilation systems

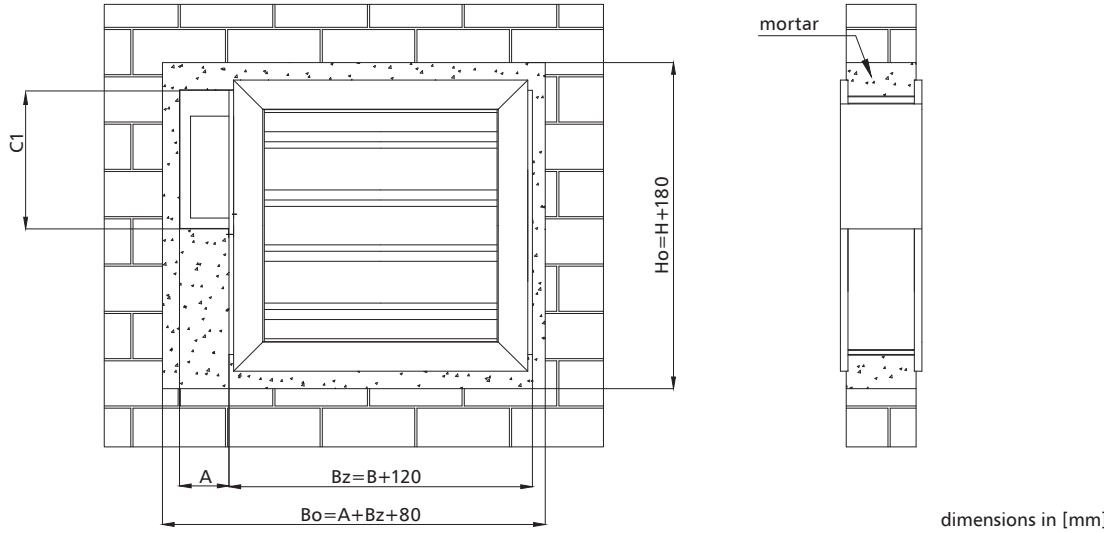
11.5 | Installation

The mcr WIP/V and mcr WIP/V-M rectangular dampers are E120(v_{ew} i↔o)1000C₁₀₀₀AA multi rated if installed in concrete partitions with a min. thickness of 110 mm, partitions made of full bricks or aerated concrete blocks with a thickness of at least 115 mm.

11.5.1 | Preparation of installation openings

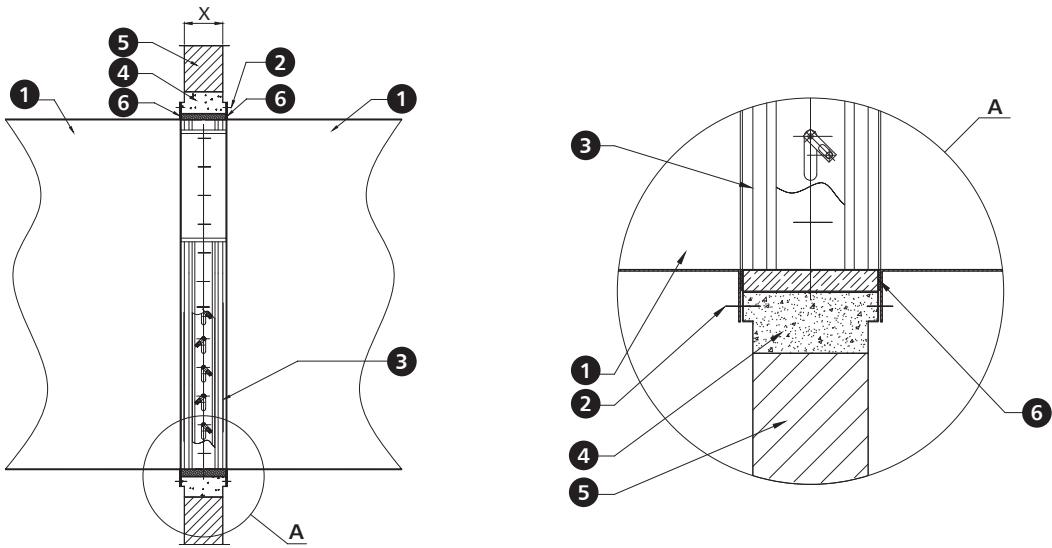
The minimum dimensions of the installation opening that permits correct installation of the mcr WIP/V, mcr WIP/V-M damper is:

- Preferred
 $B_o = (A + B_z + 80)$ mm
 $H_o = (H + 180)$ mm



	BEN	BEE	BE
C1 [mm]	385	335	335
A [mm]	125	125	125

11.5.2 | Sample installation in concrete or masonry walls

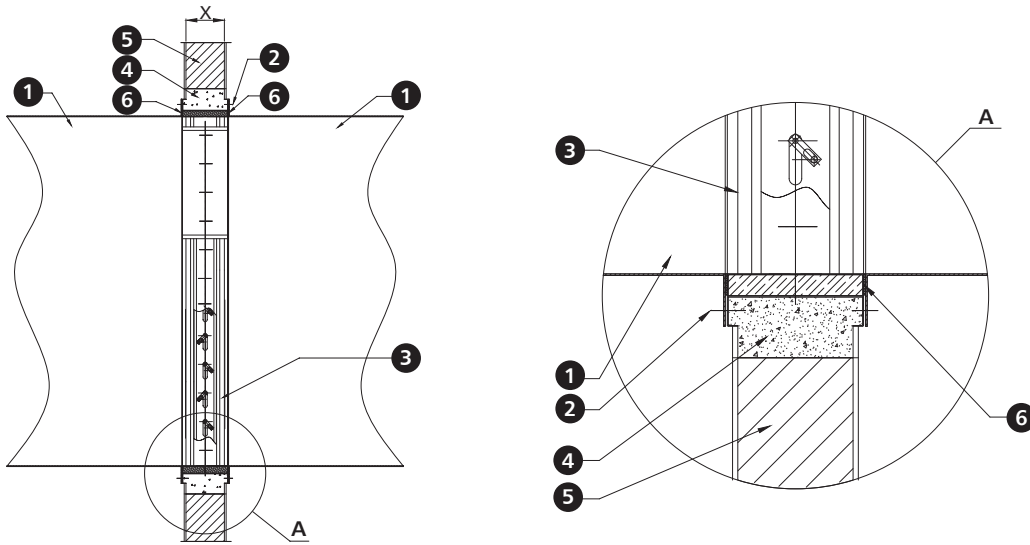


- 1. smoke ventilation duct
- 2. ST4.2 x 16 sheet metal screw
- 3. mcr WIP/V fire damper
- 4. sealing - e.g. cement masonry mortar*
- 5. masonry wall
- 6. heat resistant gasket
- X. wall thickness

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

mcr WIP/V, mcr WIP/V-M | Multi-blade smoke control damper for multi-compartment fire ventilation systems

11.5.3 | Sample installation in concrete block or full brick walls



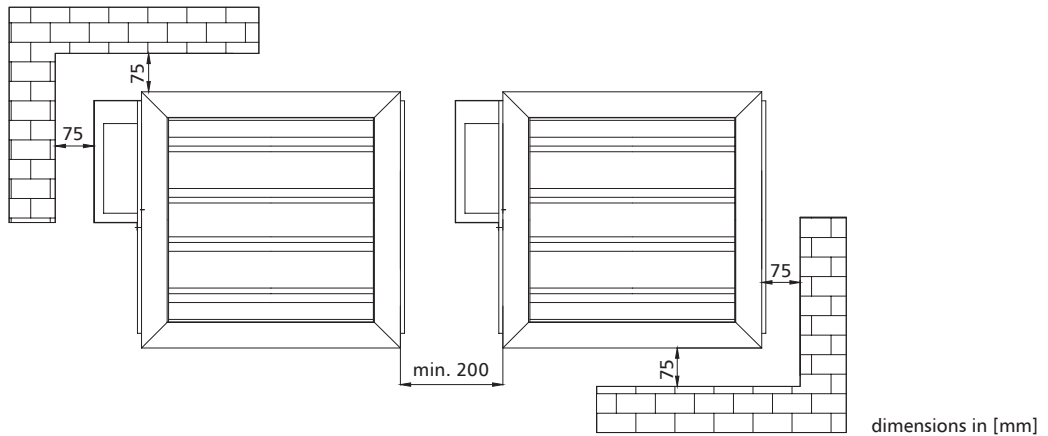
- | | | |
|-----------------------------------|---|--------------------------|
| 1. smoke ventilation duct | 4. sealing - e.g. cement masonry mortar* | 6. heat resistant gasket |
| 2. ST4.2 x 16 sheet metal screw | 5. wall of concrete blocks or full bricks | X wall thickness |
| 3. mcr WIP/V smoke control damper | | |

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

» **Damper installation with a vertical louver rotation axis**

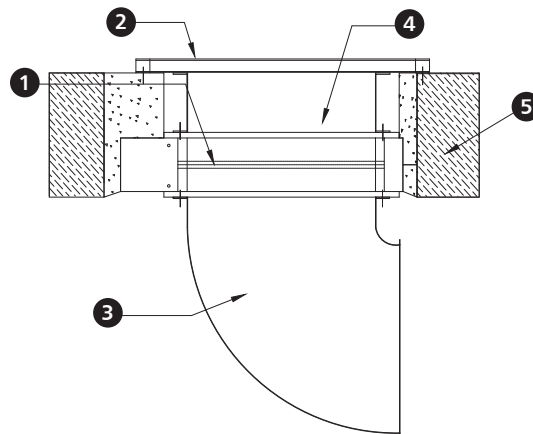
The damper can operate with a vertical louver rotation axis with a top or bottom-mounted mechanism.

» **Distance between systems and partitions**



mcr WIP/V, mcr WIP/V-M | Multi-blade smoke control damper for multi-compartment fire ventilation systems

» Example applications - installation with a masking element



- | | |
|-------------------------------------|---|
| 1. mcr WIP/V fire damper | 4. duct - ventilation straight connection piece |
| 2. masking element | 5. wall, floor slab |
| 3. smoke extract or air supply duct | |

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

mcr WIP/V, mcr WIP/V-M | Multi-blade smoke control damper for multi-compartment fire ventilation systems

11.6 | mcr WIP/V, mcr WIP/V-M rectangular dampers technical parameters

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]																		
		200					250					300								
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [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	1 836	22	46
		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	1 652	13	39
		8			1 224	23	44			1 530	23	45			1 836	22	46	2 203	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	2 030	13	40
		8			1 469	23	45			1 836	23	46			2 203	22	46	2 754	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	29	0.105	0.089	1 285	5	29				
	6			1 285	13	38			1 607	13	39			1 928	12	39	2 570	12	40	
	8			1 714	22	45			2 142	22	46			2 570	22	47	3 213	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	2 938	12	40	
	8			1 958	22	46			2 448	22	47			2 938	22	47	3 672	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	3 305	12	40	
	8			2 203	22	46			2 754	22	47			3 305	22	48	4 131	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	3 672	12	40	
	8			2 448	22	46			3 060	22	47			3 672	21	48	4 590	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	4 039	12	41	
	8			2 693	22	47			3 366	22	48			4 039	22	49	5 049	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	4 406	12	41	
	8			2 938	22	47			3 672	22	48			4 406	21	49	5 508	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	4 774	12	41	
	8			3 182	22	48			3 978	22	49			4 774	21	49	5 967	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	5 141	12	42	
	8			3 427	22	48			4 284	22	49			5 141	21	49	6 426	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	5 508	12	42	
	8			3 672	21	48			4 590	21	49			5 508	21	49	6 885	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	5 875	12	42	
	8			3 917	21	48			4 896	21	49			5 875	21	49	7 344	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	6 242	11	42	
	8			4 162	21	48			5 202	21	49			6 242	20	49	7 803	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	6 610	11	42	
	8			4 406	21	48			5 508	21	49			6 610	20	50	8 262	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	7 344	11	43	
	8			4 896	21	49			6 120	21	50			7 344	20	50	9 180	20	50	
	10			6 120	32	54			7 650	32	55			9 180	31	56				

mcr WIP/V, mcr WIP/V-M | Multi-blade smoke control damper for multi-compartment fire ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		350					400					450					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [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	0.280	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	0.300	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	0.320	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	0.340	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	

mcr WIP/V, mcr WIP/V-M | Multi-blade smoke control damper for multi-compartment fire ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		500					550					600					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [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	

mcr WIP/V, mcr WIP/V-M | Multi-blade smoke control damper for multi-compartment fire ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		650					700					750					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [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	

mcr WIP/V, mcr WIP/V-M | Multi-blade smoke control damper for multi-compartment fire ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]																				
		800					850					900					1000					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	200	4			1 958	5	29			2 081	5	29			2 203	5	29			2 448	5	29
		6			2 938	11	39			3 121	11	40			3 305	10	39			3 672	10	40
		8	0.160	0.136	3 917	19	47	0.170	0.145	4 162	19	47	0.180	0.153	4 406	19	47	0.200	0.170	4 896	19	47
		10			4 896	30	53			5 202	30	53			5 508	29	53			6 120	29	53
	250	4			2 448	5	30			2 601	5	30			2 754	5	30			3 060	5	30
		6			3 672	11	40	0.213	0.181	3 902	11	41	0.225	0.191	4 131	10	40	0.250	0.213	4 590	10	41
		8	0.200	0.170	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			2 938	5	31			3 121	5	31			3 305	5	31			3 672	5	31
		6			4 406	11	41	0.255	0.217	4 682	11	41	0.270	0.230	4 957	10	41	0.300	0.255	5 508	10	42
		8	0.240	0.204	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			3 427	5	31			3 641	5	31			3 856	4	31			4 284	4	31
		6			5 141	10	41	0.298	0.253	5 462	10	42	0.315	0.268	5 783	10	41	0.350	0.298	6 426	10	42
		8	0.280	0.238	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			3 917	5	31			4 162	5	32			4 406	4	31			4 896	4	32
		6			5 875	10	42	0.340	0.289	6 242	10	42	0.360	0.306	6 610	10	42	0.400	0.340	7 344	10	42
		8	0.320	0.272	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			4 406	5	32			4 682	4	32			4 957	4	31			5 508	4	32
		6			6 610	10	42	0.383	0.325	7 023	10	42	0.405	0.344	7 436	10	42	0.450	0.383	8 262	10	42
		8	0.360	0.306	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			4 896	5	32			5 202	4	32			5 508	4	32			6 120	4	32
		6			7 344	10	43	0.425	0.361	7 803	10	43	0.450	0.383	8 262	10	42	0.500	0.425	9 180	10	43
		8	0.400	0.340	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			5 386	5	33			5 722	4	33			6 059	4	32			6 732	4	33
		6			8 078	10	43	0.468	0.397	8 583	10	43	0.495	0.421	9 088	10	43	0.550	0.468	10 098	10	43
		8	0.440	0.374	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			5 875	5	33			6 242	4	33			6 610	4	33			7 344	4	33
		6			8 813	10	44	0.510	0.434	9 364	10	43	0.540	0.459	9 914	10	43	0.600	0.510	11 016	10	44
		8	0.480	0.408	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			6 365	5	33			6 763	4	33			7 160	4	33			7 956	4	34
		6			9 547	10	44	0.553	0.470	10 144	10	44	0.585	0.497	10 741	10	44	0.650	0.553	11 934	10	44
		8	0.520	0.442	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			6 854	4	33			7 283	4	33			7 711	4	33			8 568	4	33
		6			10 282	10	44	0.595	0.506	10 924	10	44	0.630	0.536	11 567	9	43	0.700	0.595	12 852	9	44
		8	0.560	0.476	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			7 344	4	34			7 803	4	33			8 262	4	33			9 180	4	34
		6			11 016	10	44	0.638	0.542	11 705	10	44	0.675	0.574	12 393	9	44	0.750	0.638	13 770	9	44
		8	0.600	0.510	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			7 834	4	34			8 323	4	34			8 813	4	33			9 792	4	34
		6			11 750	10	44	0.680	0.578	12 485	10	44	0.720	0.612	13 219	9	44	0.800	0.680	14 688	9	44
		8	0.640	0.544	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			8 323	4	34			8 843	4	33			9 364	4	34			10 404	4	34
		6			12 485	10	44	0.723	0.614	13 265	9	44	0.765	0.650	14 045	9	44	0.850	0.723	15 606	9	45
		8	0.680	0.578	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			8 813	4	34			9 364	4	34			9 914	4	34			11 016	4	34
		6			13 219	10	45	0.765	0.650	14 045	9	44	0.810	0.689	14 872	9	45	0.900	0.765	16 524	9	44
		8	0.720	0.612	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			9 792	4	34			10 404	4	34			11 016	4	33			12 240	4	34
		6			14 688	9	44	0.850	0.723	15 606	9	44	0.900	0.765	16 524	9	44	1.000	0.850	18 360	9	44
		8	0.800	0.680	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/V fire damper selection program is available at www.mercor.com.pl, in the Designer Zone.

mcr WIP/V, mcr WIP/V-M | Multi-blade smoke control damper for multi-compartment fire ventilation systems

11.7 | 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	

11.8 | Accessories

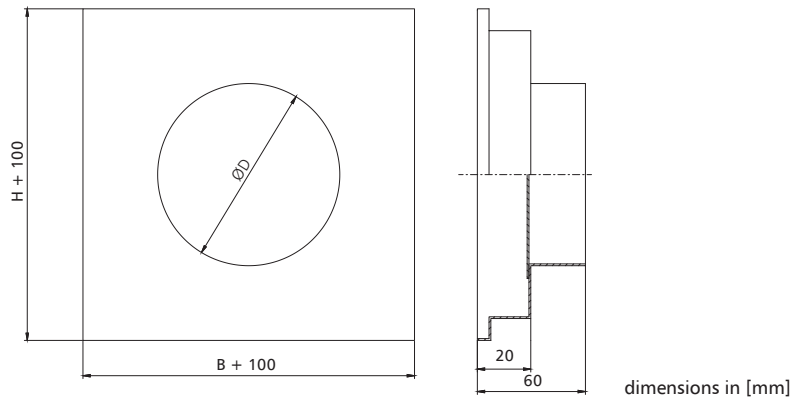
11.8.1 | mcr KRP connection stub

Mcr KRP connection stubs are used to connect a circular ventilation duct to a rectangular damper. The connection is a „bare end“ pipe. The diameter of the stub pipe is 2 mm smaller than the diameter of the ventilation duct.

Dimensions:

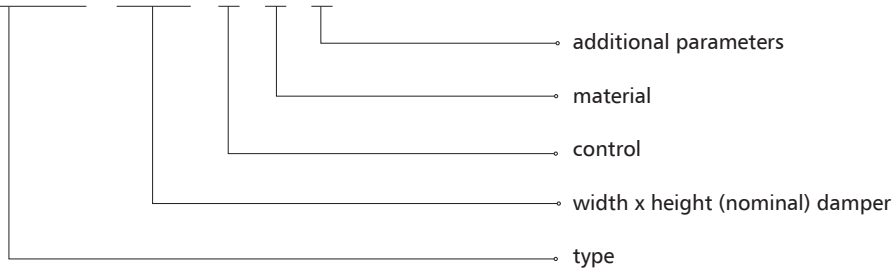
BxH - damper dimensions [mm]

ØD - diameter of the connection duct [mm]



11.9 | Marking

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



mcr WIP/V, mcr WIP/V-M | Multi-blade smoke control damper for multi-compartment fire ventilation systems

1 - control:

» trigger control mechanism

- BE24 – actuator without a return spring, U = 24 V AC/DC
- BE24-ST (with the BKE230-24 option) – actuator without a return spring, for the SBS Control system
- BE230 – actuator without a return spring, U = 230 V AC/DC
- BEE24 – actuator without a return spring, U = 24 V AC/DC
- BEN24 – actuator without a return spring, U = 24 V AC/DC
- BEE24-ST (with the BKE230-24 option) – actuator without a return spring, for the SBS Control system
- BEN24-ST (with the BKE230-24 option) – actuator without a return spring, for the SBS Control system
- BEE230 – actuator without a return spring, U = 230 V AC/DC
- BEN230 – actuator without a return spring, U = 230 V AC/DC

2 - material:

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

4 - additional parameters :

» Damper axis of rotation

- [no symbol] – horizontal axis of rotation
- PP_D – vertical axis of rotation – mechanism at the bottom of the damper
- PP_G – vertical axis of rotation - mechanism at the top of the damper

» Design standard

- [no symbol] – left damper
- KP – right damper

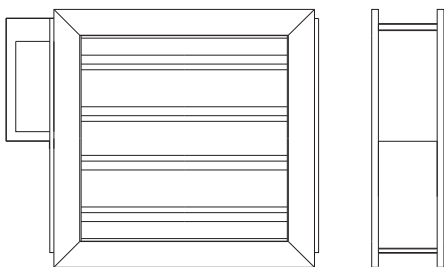
NOTE: separate additional parameters entered with the “/” sign

example marking:

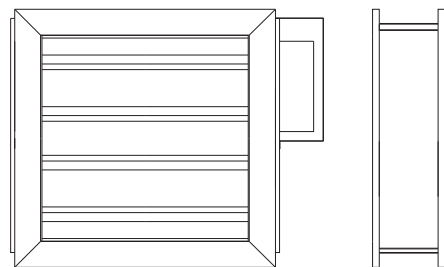
mcr WIP/V 400 x 400 BLE24
Louvered smoke control damper with a 24 V actuator with limit switches.

11.9.1 | Design standard

» left damper standard



» right damper

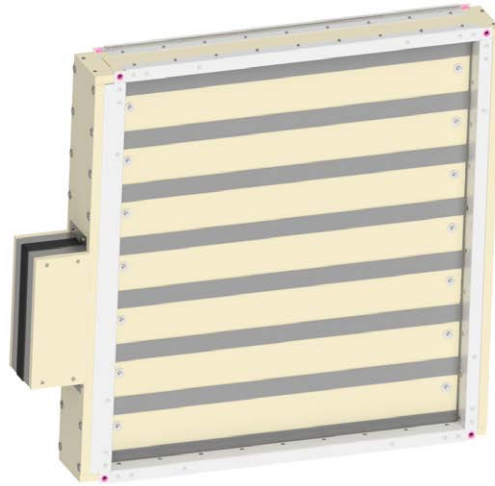


reverse installation possible

Chapter 16 - power supply and control (p. 262) contains the following information:
- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper.



downloadable models
on the website
under the designer zone tab



CTO S.A.



HYGIENIC CERTIFICATE



- » **EI120S, EI90S, ES120**
- » Fire resistance class: EI120 ($v_e i \leftrightarrow o$)S, EI90 ($h_o i \leftrightarrow o$)S, E120 ($h_o i \leftrightarrow o$)S.
- » Certificate of constancy of performance 2434-CPR-0031.
- » Dampers certified for compliance with EN 15650.
- » Dampers qualified under EN 13501-3 and tested under EN 1366-2.
- » Narrow louvered cut-off dampers.

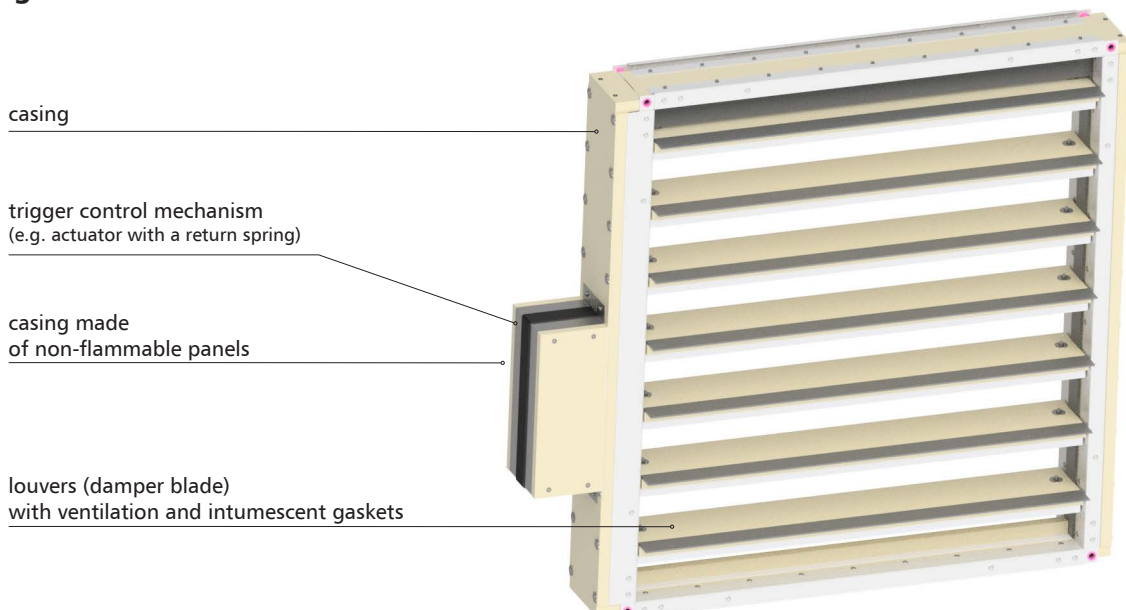
12.1| Application

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 fire dampers are intended for use in systems, where the components such as a silencer, bend or supply and extraction grille are installed downstream of the fire damper.

During a fire, they preserve the fire resistance rating of the construction partition that the ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and fire gasses to the remaining part of the building which is not on fire. During normal system operation, the damper louvers are open. In case of fire, the louver closes. Admissible flow velocity in the connected duct is 12 m/s. In the version designed for explosion hazard zones (EX version), the dampers can be operated in gas explosion hazard zone 1 inside and outside ventilation ducts and in dust explosion hazard zone 21 outside these ducts. The dampers have been certified in compliance with the ATEX directive 94/9/EC and meet the requirements of group II category 2G and -/2D:

- » II 2G Ex h IIC T6 Gb
 - » II -/2D Ex h IIIC T72° -/Db
- Ambient temperature: Ta: -20°... +50°C

12.2| Design



The multi-blade mcr WIP PRO/S damper consists of a rectangular casing made of two steel sections connected with a non-combustible plate using rivets and galvanized steel sheet fasteners, a set of movable blades rotating around their axes and a trigger control mechanism. The damper casing is made of fire resistant panels and galvanized "C" shape metal sheet profiles. The device is reinforced on both sides with steel flat bar corners. Intumescent and ventilation gaskets are installed on the inside of the damper. Each damper blade is made of two fire resistant panels with a thickness of 20 mm each, which are displaced against each other. An intumescent gasket and ventilation gasket are attached with staples along the entire blade length. The damper blades revolve on their own axes, which consist of two steel pins. Each pin is mounted in a sleeve installed on the vertical side H of the fire damper casing.

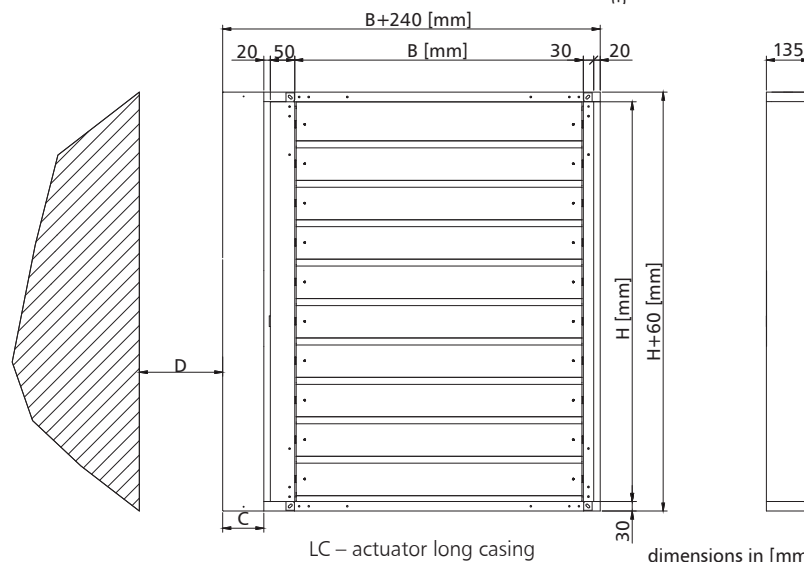
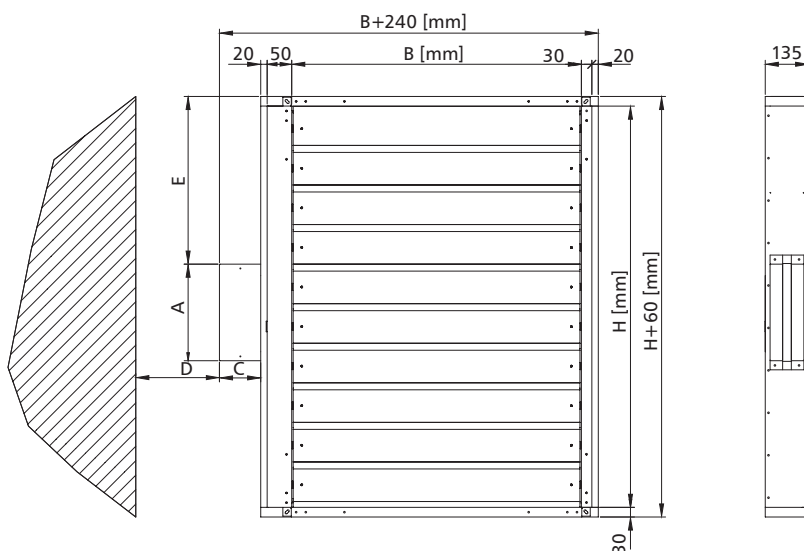
12.3 | Versions

12.3.1 | Damper closing and opening with an actuator

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

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

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



mechanism	A	C	D	E
BF, BFL, BFN	298	120	75	formula
EXBF	400	175	75	formula
MLF, MF	298	120	75	formula

for an even number of blades				
$E \text{ [mm]} = (H/2 - 123) + 30$				
for an odd number of blades				
$E \text{ [mm]} = (H/2 - 61,5) + 30$				

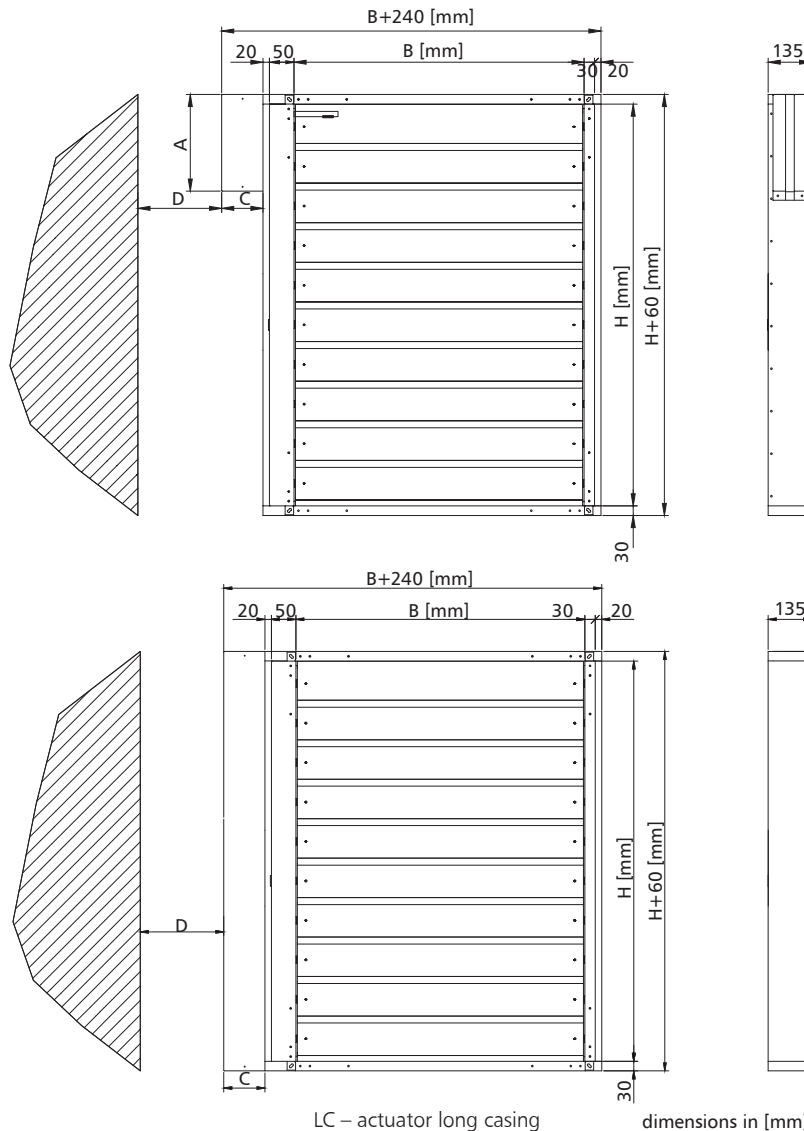
Number of blades = $H/123$

insert symmetrically against the wall axis

12.3.2 | mcr WIP PRO/S - 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 louvers of the fire damper remain open. In case of fire, the louvers close automatically or through the fire automation system in case of a damper with an electromagnetic trigger.

mcr WIP PRO/S dampers are equipped with a KW1 trigger control mechanism with a drive spring and a cam-lever system. A 74°C thermal trigger (optionally 95°C) is integrated into the damper mechanism. Once the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. A mechanical blade position indicator is placed on the KW1 mechanism. 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. The mechanism features a test and blade button-release functions. Blade re-opening is activated manually.



12.4 | Dimensions

- » Rectangular dampers:
 - » nominal width B: from 110 mm to 900 mm
 - » nominal height H from 270 mm to 1250 mm
 - » maximum single damper cross-section surface up to 1.125 m²

Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 10 mm increments within the given ranges).

Square dampers may also be additionally equipped with round connection collars allowing for so called “bare end” connection to round ducts.

12.5 | Installation

Rectangular mcr WIP PRO/S fire dampers are class EI120(v_e i \leftrightarrow o)S rated if installed in concrete partitions with a min. thickness of 120 mm, partitions made of full bricks or aerated concrete blocks with a min. thickness of 120 mm, light walls with EI120 or higher fire rating, and EI90(h_o i \leftrightarrow o)S / EI20(h_o i \leftrightarrow o)S rated when installed in floor slabs with a min. thickness of 150 mm.

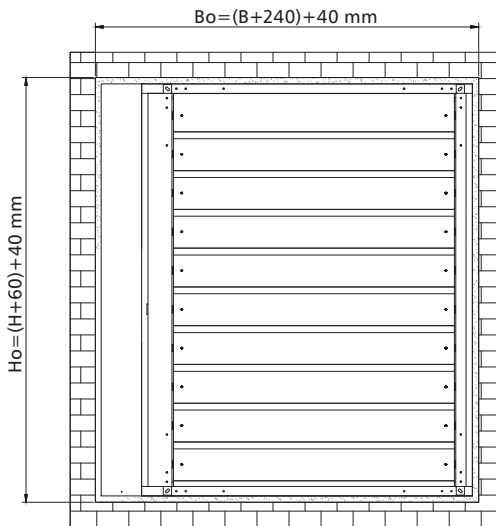
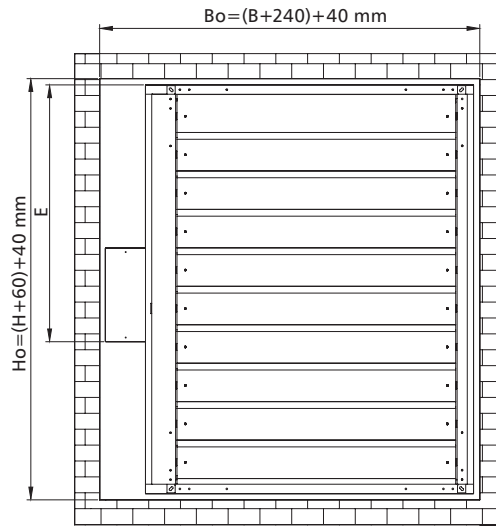
12.5.1 | Preparation of installation openings

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

Preferred

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

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



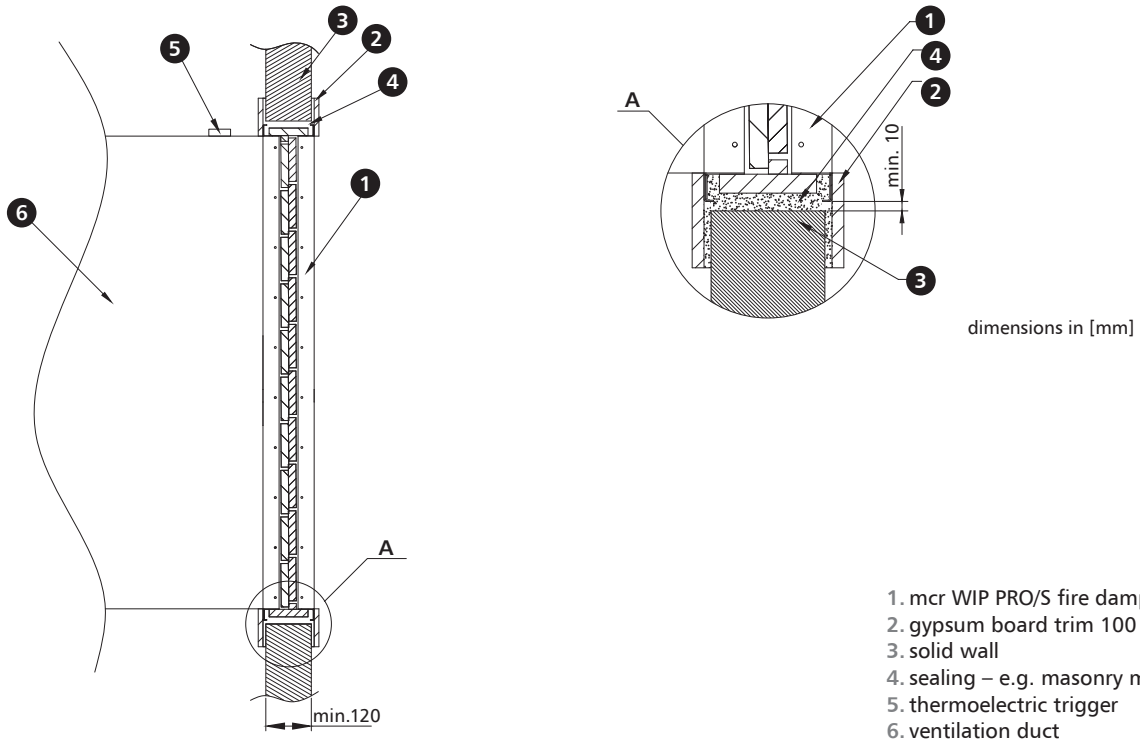
LC – actuator long casing

dimensions in [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:

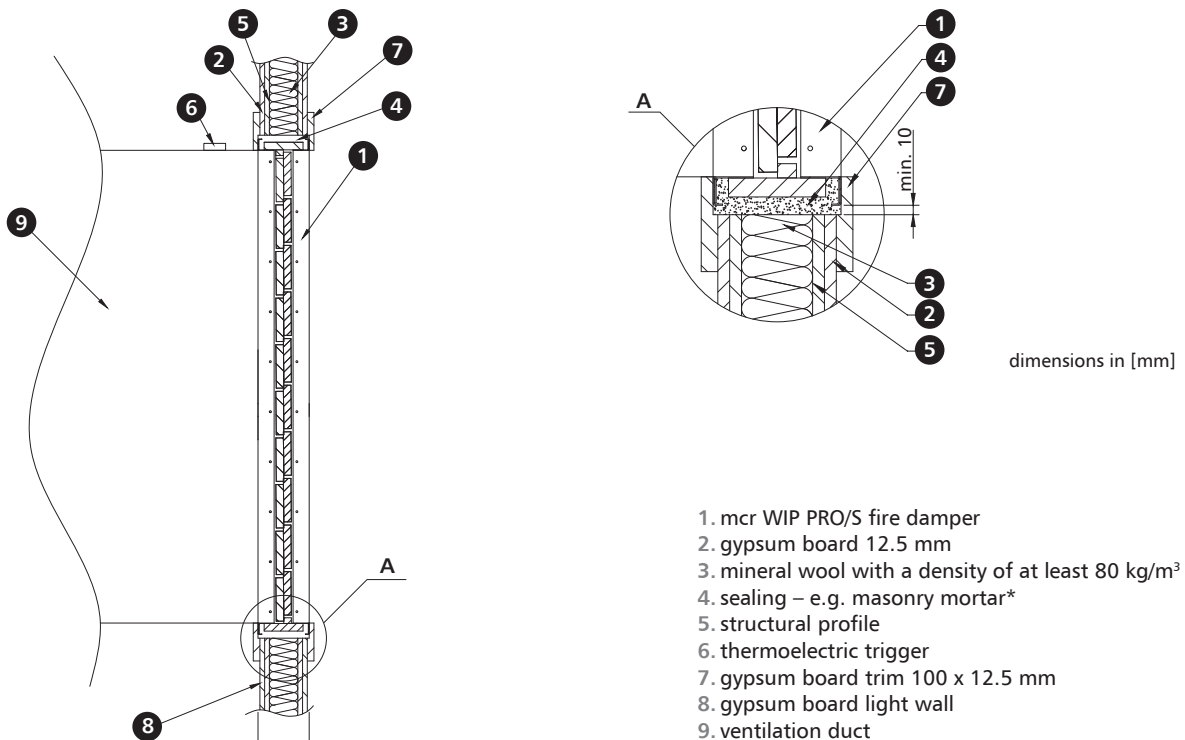
mechanism	for an even number of blades	for an odd number of blades
BF, BLF, BFN, MF, MLF	$E \text{ [mm]} = (H/2 - 123) + 30$	$E \text{ [mm]} = (H/2 - 61,5) + 30$
KW1	$E \text{ [mm]} = 0$	$E \text{ [mm]} = 0$

12.5.2 | Sample installation in concrete block or full brick walls



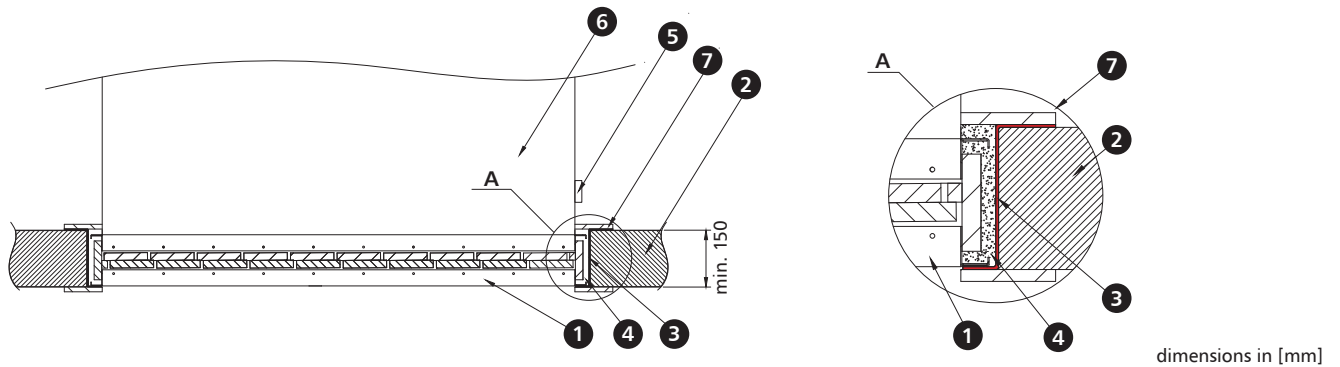
* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

12.5.3 | Sample installation in light walls



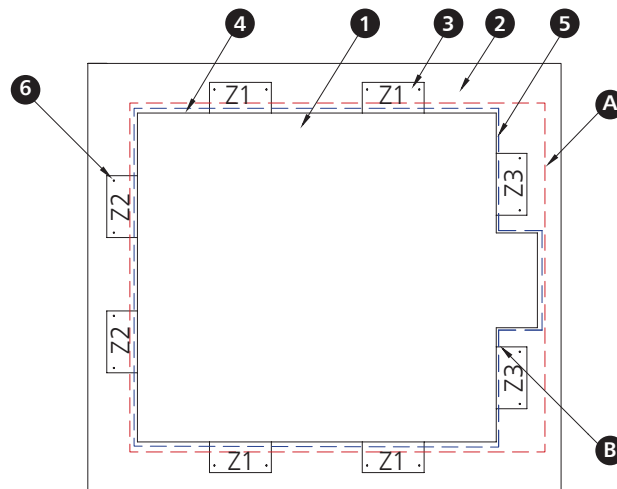
* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

12.5.4 | Sample installation in floor slabs



- 1. mcr WIP PRO/S fire damper
- 2. concrete floor slab
- 3. Z-shape installation bars
- 4. sealing – e.g. masonry mortar*
- 5. thermoelectric trigger
- 6. ventilation duct
- 7. gypsum board trims 100 x 12.5 mm

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.



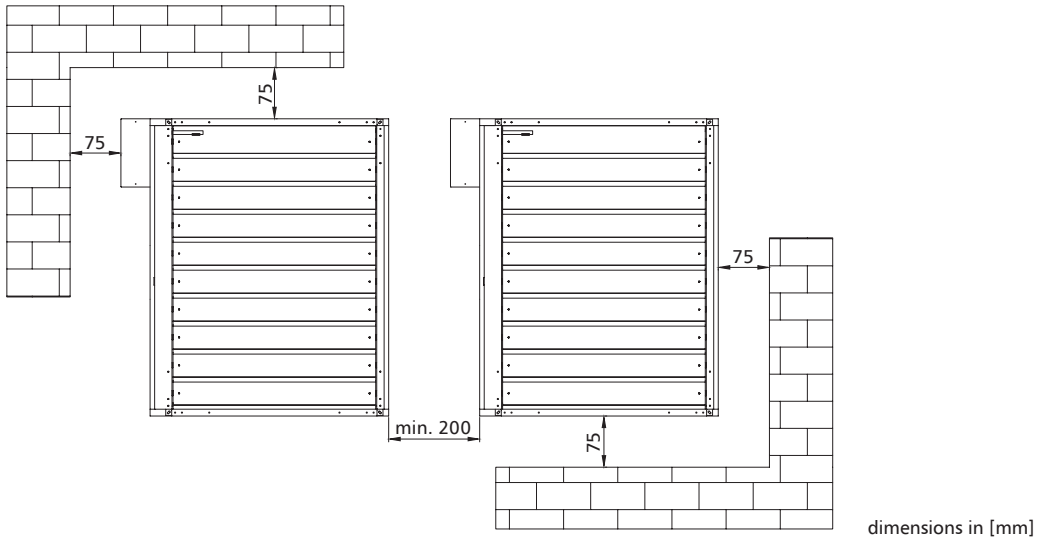
- 1. mcr WIP PRO/S fire damper
- 2. concrete floor slab
- 3. Z-shape installation bars
- 4. sealing – e.g. masonry mortar*
- 5. installation opening A or B
- 6. anchor plug M8 x 80 mm

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

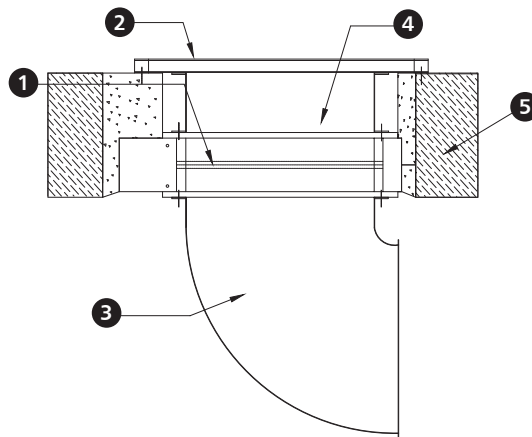
For mcr WIP PRO/S damper installation in the floor slab, use Z1/Z2/Z3 fasteners compatible with the width of the fire damper and construction opening "5" as per the guidelines in the operation and maintenance manual. Z1, Z2, Z3 fasteners are not included with the fire damper.

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.

» Distance between systems and partitions



» Example applications - installation with a masking element



- 1. mcr WIP PRO/S fire damper
- 2. masking element
- 3. ventilation duct

- 4. duct - ventilation straight connection piece
- 5. wall, floor slab

If a mcr WIP PRO/S damper is used, the application of louvers (no single-blade design) it is possible to use the space in front of and behind the damper for such system elements as a masking element or a silencer with additional attenuation barrier or to route a duct along the wall using a duct bend or reduction.

12.6 | mcr WIP PRO/S rectangular dampers technical parameters

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		270					300					350					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	110	4	0.030	0.019	269	13	33	0.033	0.019	269	14	34	0.039	0.019	269	16	36
		6			404	30	44			404	30	44			404	36	46
		8			539	53	51			539	54	52			539	63	54
		10			673	82	57			673	85	58			673	99	60
	150	4	0.041	0.026	367	13	35	0.045	0.026	367	14	35	0.053	0.026	367	16	37
		6			551	30	45			551	30	46			551	36	48
		8			734	53	53			734	54	53			734	63	55
		10			918	82	59			918	85	59			918	99	61
	200	4	0.054	0.034	490	13	36	0.060	0.034	490	14	36	0.070	0.034	490	16	38
		6			734	30	46			734	30	47			734	36	49
		8			979	53	54			979	54	54			979	63	56
		10			1 224	82	60			1 224	84	60			1 224	99	62
250	4	0.068	0.043	612	13	37	0.075	0.043	612	14	37	0.088	0.043	612	16	39	
	6			918	30	47			918	30	48			918	36	50	
	8			1 224	53	55			1 224	54	55			1 224	63	57	
	10			1 530	82	61			1 530	85	61			1 530	99	63	
300	4	0.081	0.051	734	13	38	0.090	0.051	734	14	38	0.105	0.051	734	16	40	
	6			1 102	30	48			1 102	30	49			1 102	36	51	
	8			1 469	53	56			1 469	54	56			1 469	63	58	
	10			1 836	82	62			1 836	85	62			1 836	99	64	
350	4	0.095	0.060	857	13	38	0.105	0.060	857	14	39	0.123	0.060	857	16	41	
	6			1 285	30	49			1 285	30	49			1 285	36	51	
	8			1 714	53	56			1 714	54	57			1 714	63	59	
	10			2 142	82	62			2 142	85	63			2 142	99	65	
400	4	0.108	0.068	979	13	39	0.120	0.068	979	14	39	0.140	0.068	979	16	41	
	6			1 469	30	49			1 469	30	50			1 469	36	52	
	8			1 958	53	57			1 958	54	57			1 958	63	59	
	10			2 448	82	63			2 448	84	63			2 448	99	65	
450	4	0.122	0.077	1 102	13	39	0.135	0.077	1 102	14	40	0.158	0.077	1 102	16	42	
	6			1 652	30	50			1 652	30	50			1 652	36	52	
	8			2 203	53	57			2 203	54	58			2 203	63	60	
	10			2 754	82	63			2 754	84	64			2 754	99	66	
500	4	0.135	0.085	1 224	13	40	0.150	0.085	1 224	14	40	0.175	0.085	1 224	16	42	
	6			1 836	30	50			1 836	30	51			1 836	36	53	
	8			2 448	53	58			2 448	54	58			2 448	63	60	
	10			3 060	82	64			3 060	85	64			3 060	99	66	
550	4	0.149	0.094	1 346	2	13	0.165	0.094	1 346	14	41	0.193	0.094	1 346	16	43	
	6			2 020	4	24			2 020	30	51			2 020	36	53	
	8			2 693	7	31			2 693	54	59			2 693	63	61	
	10			3 366	10	37			3 366	84	65			3 366	99	67	
600	4	0.162	0.102	1 469	13	41	0.180	0.102	1 469	14	41	0.210	0.102	1 469	16	43	
	6			2 203	30	51			2 203	30	52			2 203	36	54	
	8			2 938	53	59			2 938	54	59			2 938	63	61	
	10			3 672	82	65			3 672	85	65			3 672	99	67	
650	4	0.176	0.111	1 591	13	41	0.195	0.111	1 591	14	41	0.228	0.111	1 591	16	43	
	6			2 387	30	52			2 387	30	52			2 387	36	54	
	8			3 182	53	59			3 182	54	59			3 182	63	62	
	10			3 978	82	65			3 978	85	65			3 978	99	67	
700	4	0.189	0.119	1 714	13	41	0.210	0.119	1 714	14	42	0.245	0.119	1 714	16	44	
	6			2 570	30	52			2 570	30	52			2 570	36	54	
	8			3 427	53	59			3 427	54	60			3 427	63	62	
	10			4 284	82	65			4 284	85	66			4 284	99	68	
750	4	0.203	0.128	1 836	13	42	0.225	0.128	1 836	14	42	0.263	0.128	1 836	16	44	
	6			2 754	30	52			2 754	30	53			2 754	36	55	
	8			3 672	53	60			3 672	54	60			3 672	63	62	
	10			4 590	82	66			4 590	85	66			4 590	99	68	
800	4	0.216	0.136	1 958	13	42	0.240	0.136	1 958	14	42	0.280	0.136	1 958	16	44	
	6			2 938	30	52			2 938	30	53			2 938	36	55	
	8			3 917	53	60			3 917	54	60			3 917	63	62	
	10			4 896	82	66			4 896	84	66			4 896	99	68	
850	4	0.230	0.145	2 081	13	42	0.255	0.145	2 081	14	43	0.298	0.145	2 081	16	45	
	6			3 121	30	53			3 121	30	53			3 121	36	55	
	8			4 162	53	60			4 162	54	61			4 162	63	63	
	10			5 202	82	66			5 202	84	66			5 202	99	68	
900	4	0.243	0.153	2 203	13	42	0.270	0.153	2 203	14	43	0.315	0.153	2 203	16	45	
	6			3 305	30	53			3 305	30	53			3 305	36	55	
	8			4 406	53	60			4 406	54	61			4 406	63	63	
	10			5 508	82	66			5 508	84	67			5 508	99	69	

Multi-blade cut-off fire dampers for comfort ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		390					450					520					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	110	4	0.043	0.028	401	12	34	0.050	0.028	401	14	36	0.057	0.037	532	12	35
		6			601	27	44			601	31	46			798	27	46
		8			802	47	52			802	55	54			1 064	48	53
		10			1 002	74	58			1 002	86	60			1 331	75	59
	150	4	0.059	0.038	546	12	35	0.068	0.038	546	14	37	0.078	0.050	726	12	36
		6			820	27	46			820	31	48			1 089	27	47
		8			1 093	47	53			1 093	55	55			1 452	48	54
		10			1 366	74	59			1 366	86	61			1 814	75	60
	200	4	0.078	0.051	729	12	36	0.090	0.051	729	14	38	0.104	0.067	968	12	38
		6			1 093	27	47			1 093	31	49			1 452	27	48
		8			1 457	47	54			1 457	55	56			1 935	48	56
		10			1 822	74	60			1 822	86	62			2 419	75	62
250	4	0.098	0.063	911	12	37	0.113	0.063	911	14	39	0.130	0.084	1 210	12	39	
	6			1 366	27	48			1 366	31	50			1 814	27	49	
	8			1 822	47	55			1 822	55	57			2 419	48	57	
	10			2 277	74	61			2 277	86	63			3 024	75	63	
300	4	0.117	0.076	1 093	12	38	0.135	0.076	1 093	14	40	0.156	0.101	1 452	12	39	
	6			1 639	27	49			1 639	31	51			2 177	27	50	
	8			2 186	47	56			2 186	55	58			2 903	48	57	
	10			2 732	74	62			2 732	86	64			3 629	75	63	
350	4	0.137	0.089	1 275	12	39	0.158	0.089	1 275	14	41	0.182	0.118	1 693	12	40	
	6			1 913	27	49			1 913	31	51			2 540	27	51	
	8			2 550	47	57			2 550	55	59			3 387	48	58	
	10			3 188	74	63			3 188	86	65			4 234	75	64	
400	4	0.156	0.101	1 457	12	39	0.180	0.101	1 457	14	41	0.208	0.134	1 935	12	41	
	6			2 186	27	50			2 186	31	52			2 903	27	51	
	8			2 915	47	57			2 915	55	59			3 871	48	59	
	10			3 643	74	63			3 643	86	65			4 838	75	65	
450	4	0.176	0.114	1 639	12	40	0.203	0.114	1 639	14	42	0.234	0.151	2 177	12	41	
	6			2 459	27	50			2 459	31	52			3 266	27	52	
	8			3 279	47	58			3 279	55	60			4 355	48	59	
	10			4 099	74	64			4 099	86	66			5 443	75	65	
500	4	0.195	0.127	1 822	12	40	0.225	0.127	1 822	14	42	0.260	0.168	2 419	12	42	
	6			2 732	27	51			2 732	31	53			3 629	27	52	
	8			3 643	47	58			3 643	55	60			4 838	48	60	
	10			4 554	74	64			4 554	86	66			6 048	75	66	
550	4	0.215	0.139	2 004	12	41	0.248	0.139	2 004	14	43	0.286	0.185	2 661	12	42	
	6			3 006	27	51			3 006	31	53			3 992	27	53	
	8			4 008	47	59			4 008	55	61			5 322	48	60	
	10			5 009	74	65			5 009	86	67			6 653	75	66	
600	4	0.234	0.152	2 186	12	41	0.270	0.152	2 186	14	43	0.312	0.202	2 903	12	42	
	6			3 279	27	52			3 279	31	54			4 355	27	53	
	8			4 372	47	59			4 372	55	61			5 806	48	61	
	10			5 465	74	65			5 465	86	67			7 258	75	66	
650	4	0.254	0.164	2 368	12	41	0.293	0.164	2 368	14	43	0.338	0.218	3 145	12	43	
	6			3 552	27	52			3 552	31	54			4 717	27	53	
	8			4 736	47	59			4 736	55	61			6 290	48	61	
	10			5 920	74	65			5 920	86	67			7 862	75	67	
700	4	0.273	0.177	2 550	12	42	0.315	0.177	2 550	14	44	0.364	0.235	3 387	12	43	
	6			3 825	27	52			3 825	31	54			5 080	27	54	
	8			5 100	47	60			5 100	55	62			6 774	48	61	
	10			6 376	74	66			6 376	86	68			8 467	75	67	
750	4	0.293	0.190	2 732	12	42	0.338	0.190	2 732	14	44	0.390	0.252	3 629	12	43	
	6			4 099	27	53			4 099	31	55			5 443	27	54	
	8			5 465	47	60			5 465	55	62			7 258	48	61	
	10			6 831	74	66			6 831	86	68			9 072	75	67	
800	4	0.312	0.202	2 915	12	42	0.360	0.202	2 915	14	43	0.416	0.269	3 871	12	43	
	6			4 372	27	53			4 372	31	54			5 806	27	54	
	8			5 829	47	60			5 829	55	61			7 741	48	61	
	10			7 286	74	66			7 286	86	67			9 677	75	67	
850	4	0.332	0.215	3 097	12	43	0.383	0.215	3 097	14	43	0.442	0.286	4 113	12	43	
	6			4 645	27	53			4 645	31	54			6 169	27	54	
	8			6 193	47	61			6 193	55	61			8 225	48	61	
	10			7 742	74	66			7 742	86	67			10 282	75	67	
900	4	0.351	0.228	3 279	12	43	0.405	0.228	3 279	14	43	0.468	0.302	4 355	12	43	
	6			4 918	27	53			4 918	31	54			6 532	27	54	
	8			6 558	47	61			6 558	55	61			8 709	48	61	
	10			8 197	74	67			8 197	86	67			10 886	75	67	

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		550					640					650					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	110	4	0.061	0.037	532	13	36	0.070	0.046	664	11	35	0.072	0.046	664	12	36
		6			798	29	46			996	26	46			996	27	47
		8			1 064	51	54			1 327	46	53			1 327	48	54
		10			1 331	79	60			1 659	72	59			1 659	76	60
	150	4	0.083	0.050	726	13	37	0.096	0.063	905	11	37	0.098	0.063	905	12	37
		6			1 089	29	48			1 358	26	47			1 358	27	48
		8			1 452	51	55			1 810	46	55			1 810	48	56
		10			1 814	79	61			2 263	72	61			2 263	76	61
	200	4	0.110	0.067	968	13	38	0.128	0.084	1 207	11	38	0.130	0.084	1 207	12	39
		6			1 452	29	49			1 810	26	49			1 810	27	49
		8			1 935	51	56			2 413	46	56			2 413	48	57
		10			2 419	79	62			3 017	72	62			3 017	76	63
250	4	0.138	0.084	1 210	13	39	0.160	0.105	1 508	11	39	0.163	0.105	1 508	12	40	
	6			1 814	29	50			2 263	26	50			2 263	27	50	
	8			2 419	51	57			3 017	46	57			3 017	48	58	
	10			3 024	79	63			3 771	72	63			3 771	76	64	
300	4	0.165	0.101	1 452	13	40	0.192	0.126	1 810	11	40	0.195	0.126	1 810	12	41	
	6			2 177	29	51			2 715	26	50			2 715	27	51	
	8			2 903	51	58			3 620	46	58			3 620	48	59	
	10			3 629	79	64			4 525	72	64			4 525	76	64	
350	4	0.193	0.118	1 693	13	41	0.224	0.147	2 112	11	40	0.228	0.147	2 112	12	41	
	6			2 540	29	51			3 168	26	51			3 168	27	52	
	8			3 387	51	59			4 224	46	58			4 224	48	59	
	10			4 234	79	65			5 279	72	64			5 279	76	65	
400	4	0.220	0.134	1 935	13	41	0.256	0.168	2 413	11	41	0.260	0.168	2 413	12	42	
	6			2 903	29	52			3 620	26	52			3 620	27	52	
	8			3 871	51	59			4 827	46	59			4 827	48	60	
	10			4 838	79	65			6 034	72	65			6 034	76	66	
450	4	0.248	0.151	2 177	13	42	0.288	0.189	2 715	11	42	0.293	0.189	2 715	12	42	
	6			3 266	29	52			4 073	26	52			4 073	27	53	
	8			4 355	51	60			5 430	46	60			5 430	48	60	
	10			5 443	79	66			6 788	72	65			6 788	76	66	
500	4	0.275	0.168	2 419	13	42	0.320	0.210	3 017	11	42	0.325	0.210	3 017	12	43	
	6			3 629	29	53			4 525	26	53			4 525	27	53	
	8			4 838	51	60			6 034	46	60			6 034	48	61	
	10			6 048	79	66			7 542	72	66			7 542	76	67	
550	4	0.303	0.185	2 661	13	43	0.352	0.230	3 318	11	42	0.358	0.230	3 318	12	43	
	6			3 992	29	53			4 978	26	53			4 978	27	54	
	8			5 322	51	61			6 637	46	60			6 637	48	61	
	10			6 653	79	67			8 296	72	66			8 296	76	67	
600	4	0.330	0.202	2 903	13	43	0.384	0.251	3 620	11	43	0.390	0.251	3 620	12	44	
	6			4 355	29	54			5 430	26	53			5 430	27	54	
	8			5 806	51	61			7 240	46	61			7 240	48	62	
	10			7 258	79	67			9 050	72	67			9 050	76	67	
650	4	0.358	0.218	3 145	13	44	0.416	0.272	3 922	11	43	0.423	0.272	3 922	12	44	
	6			4 717	29	54			5 883	26	54			5 883	27	54	
	8			6 290	51	62			7 844	46	61			7 844	48	62	
	10			7 862	79	67			9 805	72	67			9 805	76	68	
700	4	0.385	0.235	3 387	13	44	0.448	0.293	4 224	11	43	0.455	0.293	4 224	12	44	
	6			5 080	29	54			6 335	26	54			6 335	27	55	
	8			6 774	51	62			8 447	46	61			8 447	48	62	
	10			8 467	79	68			10 559	72	67			10 559	76	68	
750	4	0.413	0.252	3 629	13	44	0.480	0.314	4 525	11	44	0.488	0.314	4 525	12	44	
	6			5 443	29	55			6 788	26	54			6 788	27	55	
	8			7 258	51	62			9 050	46	62			9 050	48	63	
	10			9 072	79	68			11 313	72	68			11 313	76	68	
800	4	0.440	0.269	3 871	13	44	0.512	0.335	4 827	11	44	0.520	0.335	4 827	12	44	
	6			5 806	29	55			7 240	26	55			7 240	27	55	
	8			7 741	51	62			9 654	46	62			9 654	48	63	
	10			9 677	79	68			12 067	72	68			12 067	76	68	
850	4	0.468	0.286	4 113	13	45	0.544	0.356	5 129	11	44	0.553	0.356	5 129	12	44	
	6			6 169	29	55			7 693	26	55			7 693	27	55	
	8			8 225	51	63			10 257	46	62			10 257	48	63	
	10			10 282	79	69			12 821	72	68			12 821	76	68	
900	4	0.495	0.302	4 355	13	45	0.576	0.377	5 430	11	45	0.585	0.377	5 430	12	44	
	6			6 532	29	56			8 145	26	52			8 145	27	55	
	8			8 709	51	63			10 860	46	60			10 860	48	63	
	10			10 886	79	69			13 576	72	65			13 576	76	68	

Multi-blade cut-off fire dampers for comfort ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		700					760					800					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	110	4	0.077	0.046	664	14	38	0.084	0.055	795	12	37	0.088	0.055	795	10	34
		6			996	30	48			1 193	28	48			1 193	22	45
		8			1 327	54	56			1 590	50	55			1 590	40	52
		10			1 659	85	61			1 988	78	61			1 988	62	58
	150	4	0.105	0.063	905	14	39	0.114	0.075	1 084	12	39	0.120	0.075	1 084	10	36
		6			1 358	30	49			1 626	28	49			1 626	22	46
		8			1 810	54	57			2 169	50	57			2 169	40	54
		10			2 263	85	63			2 711	78	62			2 711	62	60
	200	4	0.140	0.084	1 207	14	40	0.152	0.100	1 446	12	40	0.160	0.100	1 446	10	37
		6			1 810	30	51			2 169	28	50			2 169	22	48
		8			2 413	54	58			2 892	50	58			2 892	40	55
		10			3 017	85	64			3 614	78	64			3 614	62	61
250	4	0.175	0.105	1 508	14	41	0.190	0.126	1 807	12	41	0.200	0.126	1 807	10	38	
	6			2 263	30	52			2 711	28	51			2 711	22	49	
	8			3 017	54	59			3 614	50	59			3 614	40	56	
	10			3 771	85	65			4 518	78	65			4 518	62	62	
300	4	0.210	0.126	1 810	14	42	0.228	0.151	2 169	12	42	0.240	0.151	2 169	10	39	
	6			2 715	30	53			3 253	28	52			3 253	22	49	
	8			3 620	54	60			4 337	50	60			4 337	40	57	
	10			4 525	85	66			5 422	78	66			5 422	62	63	
350	4	0.245	0.147	2 112	14	43	0.266	0.176	2 530	12	42	0.280	0.176	2 530	10	39	
	6			3 168	30	53			3 795	28	53			3 795	22	50	
	8			4 224	54	61			5 060	50	60			5 060	40	57	
	10			5 279	85	66			6 325	78	66			6 325	62	63	
400	4	0.280	0.168	2 413	14	43	0.304	0.201	2 892	12	43	0.320	0.201	2 892	10	40	
	6			3 620	30	54			4 337	28	53			4 337	22	51	
	8			4 827	54	61			5 783	50	61			5 783	40	58	
	10			6 034	85	67			7 229	78	67			7 229	62	64	
450	4	0.315	0.189	2 715	14	44	0.342	0.226	3 253	12	43	0.360	0.226	3 253	10	41	
	6			4 073	30	54			4 879	28	54			4 879	22	51	
	8			5 430	54	62			6 506	50	61			6 506	40	59	
	10			6 788	85	68			8 132	78	67			8 132	62	64	
500	4	0.350	0.210	3 017	14	44	0.380	0.251	3 614	12	44	0.400	0.251	3 614	10	41	
	6			4 525	30	55			5 422	28	54			5 422	22	52	
	8			6 034	54	62			7 229	50	62			7 229	40	59	
	10			7 542	85	68			9 036	78	68			9 036	62	65	
550	4	0.385	0.230	3 318	14	45	0.418	0.276	3 976	12	44	0.440	0.276	3 976	10	41	
	6			4 978	30	55			5 964	28	55			5 964	22	52	
	8			6 637	54	63			7 952	50	62			7 952	40	59	
	10			8 296	85	68			9 940	78	68			9 940	62	65	
600	4	0.420	0.251	3 620	14	45	0.456	0.301	4 337	12	45	0.480	0.301	4 337	10	42	
	6			5 430	30	56			6 506	28	55			6 506	22	52	
	8			7 240	54	63			8 675	50	63			8 675	40	60	
	10			9 050	85	69			10 843	78	69			10 843	62	66	
650	4	0.455	0.272	3 922	14	45	0.494	0.326	4 699	12	45	0.520	0.326	4 699	10	42	
	6			5 883	30	56			7 048	28	56			7 048	22	53	
	8			7 844	54	63			9 397	50	63			9 397	40	60	
	10			9 805	85	69			11 747	78	69			11 747	62	66	
700	4	0.490	0.293	4 224	14	46	0.532	0.351	5 060	12	45	0.560	0.351	5 060	10	42	
	6			6 335	30	56			7 590	28	56			7 590	22	53	
	8			8 447	54	64			10 120	50	63			10 120	40	61	
	10			10 559	85	69			12 650	78	69			12 650	62	66	
750	4	0.525	0.314	4 525	14	46	0.570	0.377	5 422	12	46	0.600	0.377	5 422	10	43	
	6			6 788	30	56			8 132	28	56			8 132	22	53	
	8			9 050	54	64			10 843	50	64			10 843	40	61	
	10			11 313	85	70			13 554	78	69			13 554	62	67	
800	4	0.560	0.335	4 827	14	44	0.608	0.402	5 783	12	46	0.640	0.402	5 783	10	43	
	6			7 240	30	55			8 675	28	56			8 675	22	54	
	8			9 654	54	62			11 566	50	64			11 566	40	61	
	10			12 067	85	67			14 458	78	70			14 458	62	67	
850	4	0.595	0.356	5 129	14	46	0.646	0.427	6 144	12	46	0.680	0.427	6 144	10	43	
	6			7 693	30	57			9 217	28	57			9 217	22	54	
	8			10 257	54	65			12 289	50	64			12 289	40	61	
	10			12 821	85	70			15 361	78	70			15 361	62	67	
900	4	0.630	0.377	5 430	14	47	0.684	0.452	6 506	12	46	0.720	0.452	6 506	10	44	
	6			8 145	30	57			9 759	28	57			9 759	22	54	
	8			10 860	54	65			13 012	50	64			13 012	40	62	
	10			13 576	85	71			16 265	78	70			16 265	62	67	

Multi-blade cut-off fire dampers for comfort ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		890					900					950					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	110	4			927	13	38			927	13	39			927	14	40
		6			1 390	29	49			1 390	30	49			1 390	32	50
		8	0,098	0,064	1 853	51	56	0,099	0,064	1 853	53	57	0,105	0,064	1 853	57	58
		10			2 317	79	62			2 317	83	63			2 317	89	64
	150	4			1 264	13	40			1 264	13	40			1 264	14	41
		6			1 895	29	50			1 895	30	51			1 895	32	52
		8	0,134	0,088	2 527	51	58	0,135	0,088	2 527	53	58	0,143	0,088	2 527	57	59
		10			3 159	79	63			3 159	83	64			3 159	89	65
	200	4			1 685	13	41			1 685	13	41			1 685	14	42
		6			2 527	29	51			2 527	30	52			2 527	32	53
		8	0,178	0,117	3 370	51	59	0,180	0,117	3 370	53	59	0,190	0,117	3 370	57	60
		10			4 212	79	65			4 212	83	65			4 212	89	66
250	4			2 106	13	42			2 106	13	42			2 106	14	43	
	6			3 159	29	52			3 159	30	53			3 159	32	54	
	8	0,223	0,146	4 212	51	60	0,225	0,146	4 212	53	60	0,238	0,146	4 212	57	61	
	10			5 265	79	66			5 265	83	66			5 265	89	67	
300	4			2 527	13	43			2 527	13	43			2 527	14	44	
	6			3 791	29	53			3 791	30	54			3 791	32	55	
	8	0,267	0,176	5 054	51	61	0,270	0,176	5 054	53	61	0,285	0,176	5 054	57	62	
	10			6 318	79	66			6 318	83	67			6 318	89	68	
350	4			2 948	13	43			2 948	13	44			2 948	14	45	
	6			4 423	29	54			4 423	30	54			4 423	32	55	
	8	0,312	0,205	5 897	51	61	0,315	0,205	5 897	53	62	0,333	0,205	5 897	57	63	
	10			7 371	79	67			7 371	83	68			7 371	89	69	
400	4			3 370	13	44			3 370	13	44			3 370	14	45	
	6			5 054	29	54			5 054	30	55			5 054	32	56	
	8	0,356	0,234	6 739	51	62	0,360	0,234	6 739	53	62	0,380	0,234	6 739	57	63	
	10			8 424	79	68			8 424	83	68			8 424	89	69	
450	4			3 791	13	44			3 791	13	45			3 791	14	46	
	6			5 686	29	55			5 686	30	55			5 686	32	56	
	8	0,401	0,263	7 582	51	62	0,405	0,263	7 582	53	63	0,428	0,263	7 582	57	64	
	10			9 477	79	68			9 477	83	69			9 477	89	70	
500	4			4 212	13	45			4 212	13	45			4 212	14	46	
	6			6 318	29	55			6 318	30	56			6 318	32	57	
	8	0,445	0,293	8 424	51	63	0,450	0,293	8 424	53	63	0,475	0,293	8 424	57	64	
	10			10 530	79	69			10 530	83	69			10 530	89	70	
550	4			4 633	13	45			4 633	13	46			4 633	14	47	
	6			6 950	29	56			6 950	30	56			6 950	32	57	
	8	0,490	0,322	9 266	51	63	0,495	0,322	9 266	53	64	0,523	0,322	9 266	57	65	
	10			11 583	79	69			11 583	83	70			11 583	89	70	
600	4			5 054	13	46			5 054	13	46			5 054	14	47	
	6			7 582	29	56			7 582	30	57			7 582	32	58	
	8	0,534	0,351	10 109	51	64	0,540	0,351	10 109	53	64	0,570	0,351	10 109	57	65	
	10			12 636	79	69			12 636	83	70			12 636	89	71	
650	4			5 476	13	46			5 476	13	46			5 476	14	47	
	6			8 213	29	56			8 213	30	57			8 213	32	58	
	8	0,579	0,380	10 951	51	64	0,585	0,380	10 951	53	65	0,618	0,380	10 951	57	65	
	10			13 689	79	70			13 689	83	70			13 689	89	71	
700	4			5 897	13	46			5 897	13	47			5 897	14	48	
	6			8 845	29	57			8 845	30	57			8 845	32	58	
	8	0,623	0,410	11 794	51	64	0,630	0,410	11 794	53	65	0,665	0,410	11 794	57	66	
	10			14 742	79	70			14 742	83	71			14 742	89	72	
750	4			6 318	13	47			6 318	13	47			6 318	14	48	
	6			9 477	29	57			9 477	30	58			9 477	32	59	
	8	0,668	0,439	12 636	51	65	0,675	0,439	12 636	53	65	0,713	0,439	12 636	57	66	
	10			15 795	79	70			15 795	83	71			15 795	89	72	
800	4			6 739	13	47			6 739	13	47			6 739	14	48	
	6			10 109	29	57			10 109	30	58			10 109	32	59	
	8	0,712	0,468	13 478	51	65	0,720	0,468	13 478	53	65	0,760	0,468	13 478	57	66	
	10			16 848	79	71			16 848	83	71			16 848	89	72	
850	4			7 160	13	47			7 160	13	48			7 160	14	49	
	6			10 741	29	58			10 741	30	58			10 741	32	59	
	8	0,757	0,497	14 321	51	65	0,765	0,497	14 321	53	66	0,808	0,497	14 321	57	67	
	10			17 901	79	71			17 901	83	71			17 901	89	72	
900	4			7 582	13	47			7 582	13	48			7 582	14	49	
	6			11 372	29	58			11 372	30	58			11 372	32	59	
	8	0,801	0,527	15 163	51	65	0,810	0,527	15 163	53	66	0,855	0,527	15 163	57	67	
	10			18 954	79	71			18 954	83	72			18 954	89	73	

mcr WIP PRO/S | Multi-blade cut-off fire dampers for comfort ventilation systems

B – nominal width [mm]
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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		1010					1050					1100					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	110	4	0,111	0,073	1 058	12	38	0,116	0,073	1 058	13	39	0,121	0,073	1 058	15	41
		6			1 587	28	49			1 587	29	49			1 587	33	51
		8			2 116	50	57			2 116	51	57			2 116	59	59
		10			2 645	77	62			2 645	79	63			2 645	93	65
	150	4	0,152	0,100	1 443	12	40	0,158	0,100	1 443	13	40	0,165	0,100	1 443	15	42
		6			2 164	28	50			2 164	29	51			2 164	33	53
		8			2 886	50	58			2 886	51	58			2 886	59	60
		10			3 607	77	64			3 607	79	64			3 607	93	66
	200	4	0,202	0,134	1 924	12	41	0,210	0,134	1 924	13	41	0,220	0,134	1 924	15	43
		6			2 886	28	52			2 886	29	52			2 886	33	54
		8			3 848	50	59			3 848	51	59			3 848	59	61
		10			4 810	77	65			4 810	79	65			4 810	93	67
250	4	0,253	0,167	2 405	12	42	0,263	0,167	2 405	13	42	0,275	0,167	2 405	15	44	
	6			3 607	28	53			3 607	29	53			3 607	33	55	
	8			4 810	50	60			4 810	51	60			4 810	59	62	
	10			6 012	77	66			6 012	79	66			6 012	93	68	
300	4	0,303	0,200	2 886	12	43	0,315	0,200	2 886	13	43	0,330	0,200	2 886	15	45	
	6			4 329	28	53			4 329	29	54			4 329	33	56	
	8			5 772	50	61			5 772	51	61			5 772	59	63	
	10			7 214	77	67			7 214	79	67			7 214	93	69	
350	4	0,354	0,234	3 367	12	43	0,368	0,234	3 367	13	44	0,385	0,234	3 367	15	46	
	6			5 050	28	54			5 050	29	54			5 050	33	56	
	8			6 733	50	62			6 733	51	62			6 733	59	64	
	10			8 417	77	67			8 417	79	68			8 417	93	70	
400	4	0,404	0,267	3 848	12	44	0,420	0,267	3 848	13	44	0,440	0,267	3 848	15	46	
	6			5 772	28	55			5 772	29	55			5 772	33	57	
	8			7 695	50	62			7 695	51	62			7 695	59	64	
	10			9 619	77	68			9 619	79	68			9 619	93	70	
450	4	0,455	0,301	4 329	12	45	0,473	0,301	4 329	13	45	0,495	0,301	4 329	15	47	
	6			6 493	28	55			6 493	29	55			6 493	33	57	
	8			8 657	50	63			8 657	51	63			8 657	59	65	
	10			10 822	77	68			10 822	79	69			10 822	93	71	
500	4	0,505	0,334	4 810	12	45	0,525	0,334	4 810	13	45	0,550	0,334	4 810	15	47	
	6			7 214	28	56			7 214	29	56			7 214	33	58	
	8			9 619	50	63			9 619	51	63			9 619	59	65	
	10			12 024	77	69			12 024	79	69			12 024	93	71	
550	4	0,556	0,367	5 291	12	45	0,578	0,367	5 291	13	46	0,605	0,367	5 291	15	48	
	6			7 936	28	56			7 936	29	56			7 936	33	58	
	8			10 581	50	63			10 581	51	64			10 581	59	66	
	10			13 226	77	69			13 226	79	70			13 226	93	72	
600	4	0,606	0,401	5 772	12	46	0,630	0,401	5 772	13	46	0,660	0,401	5 772	15	48	
	6			8 657	28	56			8 657	29	57			8 657	33	59	
	8			11 543	50	64			11 543	51	64			11 543	59	66	
	10			14 429	77	70			14 429	79	70			14 429	93	72	
650	4	0,657	0,434	6 252	12	46	0,683	0,434	6 252	13	46	0,715	0,434	6 252	15	48	
	6			9 379	28	57			9 379	29	57			9 379	33	59	
	8			12 505	50	64			12 505	51	65			12 505	59	67	
	10			15 631	77	70			15 631	79	70			15 631	93	72	
700	4	0,707	0,468	6 733	12	46	0,735	0,468	6 733	13	47	0,770	0,468	6 733	15	49	
	6			10 100	28	57			10 100	29	57			10 100	33	59	
	8			13 467	50	65			13 467	51	65			13 467	59	67	
	10			16 834	77	70			16 834	79	71			16 834	93	73	
750	4	0,758	0,501	7 214	12	47	0,788	0,501	7 214	13	47	0,825	0,501	7 214	15	49	
	6			10 822	28	57			10 822	29	58			10 822	33	60	
	8			14 429	50	65			14 429	51	65			14 429	59	67	
	10			18 036	77	71			18 036	79	71			18 036	93	73	
800	4	0,808	0,534	7 695	12	47	0,840	0,534	7 695	13	47	0,880	0,534	7 695	15	49	
	6			11 543	28	58			11 543	29	58			11 543	33	60	
	8			15 391	50	65			15 391	51	65			15 391	59	67	
	10			19 238	77	71			19 238	79	71			19 238	93	73	
850	4	0,859	0,568	8 176	12	47	0,893	0,568	8 176	13	48	0,935	0,568	8 176	15	50	
	6			12 264	28	58			12 264	29	58			12 264	33	60	
	8			16 353	50	65			16 353	51	66			16 353	59	68	
	10			20 441	77	71			20 441	79	72			20 441	93	74	
900	4	0,909	0,601	8 657	12	48	0,945	0,601	8 657	13	48	0,990	0,601	8 657	15	50	
	6			12 986	28	58			12 986	29	58			12 986	33	60	
	8			17 315	50	66			17 315	51	66			17 315	59	68	
	10			21 643	77	71			21 643	79	72			21 643	93	74	

mcr WIP PRO/S | Multi-blade cut-off fire dampers for comfort ventilation systems

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		1130					1200					1250					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	110	4	0.124	0.083	1 190	12	39	0.132	0.083	1 190	13	40	0.138	0.092	1 321	11	37
		6			1 784	27	49			1 784	30	51			1 982	24	48
		8			2 379	49	57			2 379	54	58			2 642	43	55
		10			2 974	76	63			2 974	84	64			3 303	66	61
	150	4	0.170	0.113	1 622	12	40	0.180	0.113	1 622	13	41	0.188	0.125	1 801	11	39
		6			2 433	27	51			2 433	30	52			2 702	24	49
		8			3 244	49	58			3 244	54	59			3 603	43	57
		10			4 055	76	64			4 055	84	65			4 504	66	63
	200	4	0.226	0.150	2 163	12	41	0.240	0.150	2 163	13	42	0.250	0.167	2 402	11	39
		6			3 244	27	51			3 244	30	53			3 603	24	50
		8			4 326	49	59			4 326	54	60			4 804	43	57
		10			5 407	76	65			5 407	84	66			6 005	66	63
250	4	0.283	0.188	2 704	12	42	0.300	0.188	2 704	13	43	0.313	0.209	3 002	11	40	
	6			4 055	27	52			4 055	30	54			4 504	24	51	
	8			5 407	49	60			5 407	54	61			6 005	43	58	
	10			6 759	76	66			6 759	84	67			7 506	66	64	
300	4	0.339	0.225	3 244	12	43	0.360	0.225	3 244	13	44	0.375	0.250	3 603	11	41	
	6			4 866	27	53			4 866	30	54			5 404	24	51	
	8			6 489	49	61			6 489	54	62			7 206	43	59	
	10			8 111	76	66			8 111	84	68			9 007	66	65	
350	4	0.396	0.263	3 785	12	43	0.420	0.263	3 785	13	45	0.438	0.292	4 203	11	41	
	6			5 678	27	54			5 678	30	55			6 305	24	52	
	8			7 570	49	61			7 570	54	63			8 407	43	60	
	10			9 463	76	67			9 463	84	68			10 508	66	65	
400	4	0.452	0.300	4 326	12	44	0.480	0.300	4 326	13	45	0.500	0.334	4 804	11	42	
	6			6 489	27	54			6 489	30	56			7 206	24	53	
	8			8 652	49	62			8 652	54	63			9 608	43	60	
	10			10 814	76	68			10 814	84	69			12 010	66	66	
450	4	0.509	0.338	4 866	12	44	0.540	0.338	4 866	13	46	0.563	0.375	5 404	11	43	
	6			7 300	27	55			7 300	30	56			8 106	24	53	
	8			9 733	49	62			9 733	54	64			10 809	43	61	
	10			12 166	76	68			12 166	84	70			13 511	66	66	
500	4	0.565	0.376	5 407	12	45	0.600	0.376	5 407	13	46	0.625	0.417	6 005	11	43	
	6			8 111	27	55			8 111	30	57			9 007	24	54	
	8			10 814	49	63			10 814	54	64			12 010	43	61	
	10			13 518	76	69			13 518	84	70			15 012	66	67	
550	4	0.622	0.413	5 948	12	45	0.660	0.413	5 948	13	47	0.688	0.459	6 605	11	43	
	6			8 922	27	56			8 922	30	57			9 908	24	54	
	8			11 896	49	63			11 896	54	65			13 211	43	62	
	10			14 870	76	69			14 870	84	70			16 513	66	67	
600	4	0.678	0.451	6 489	12	46	0.720	0.451	6 489	13	47	0.750	0.500	7 206	11	44	
	6			9 733	27	56			9 733	30	57			10 809	24	54	
	8			12 977	49	64			12 977	54	65			14 412	43	62	
	10			16 222	76	69			16 222	84	71			18 014	66	68	
650	4	0.735	0.488	7 029	12	46	0.780	0.488	7 029	13	47	0.813	0.542	7 806	11	44	
	6			10 544	27	56			10 544	30	58			11 709	24	55	
	8			14 059	49	64			14 059	54	65			15 612	43	62	
	10			17 573	76	70			17 573	84	71			19 516	66	68	
700	4	0.791	0.526	7 570	12	46	0.840	0.526	7 570	13	48	0.875	0.584	8 407	11	44	
	6			11 355	27	57			11 355	30	58			12 610	24	55	
	8			15 140	49	64			15 140	54	66			16 813	43	63	
	10			18 925	76	70			18 925	84	71			21 017	66	68	
750	4	0.848	0.563	8 111	12	47	0.900	0.563	8 111	13	48	0.938	0.626	9 007	11	45	
	6			12 166	27	57			12 166	30	58			13 511	24	55	
	8			16 222	49	65			16 222	54	66			18 014	43	63	
	10			20 277	76	70			20 277	84	72			22 518	66	69	
800	4	0.904	0.601	8 652	12	47	0.960	0.601	8 652	13	48	1.000	0.667	9 608	11	45	
	6			12 977	27	57			12 977	30	59			14 412	24	56	
	8			17 303	49	65			17 303	54	66			19 215	43	63	
	10			21 629	76	71			21 629	84	72			24 019	66	69	
850	4	0.961	0.638	9 192	12	47	1.020	0.638	9 192	13	48	1.063	0.709	10 208	11	45	
	6			13 788	27	58			13 788	30	59			15 312	24	56	
	8			18 384	49	65			18 384	54	66			20 416	43	63	
	10			22 981	76	71			22 981	84	72			25 520	66	69	
900	4	1.017	0.676	9 733	12	47	1.080	0.676	9 733	13	49	1.125	0.751	10 809	11	46	
	6			14 599	27	58			14 599	30	59			16 213	24	56	
	8			19 466	49	65			19 466	54	67			21 617	43	64	
	10			24 332	76	71			24 332	84	73			27 022	66	69	

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

12.7 | Estimated weights of mcr WIP PRO/S dampers for rectangular ventilation ducts [kg]

		width B [mm]										
		270	300	400	500	600	700	800	900	1000	1100	1250
height H [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 KW1 trigger control mechanisms or actuators.

12.8 | Accessories

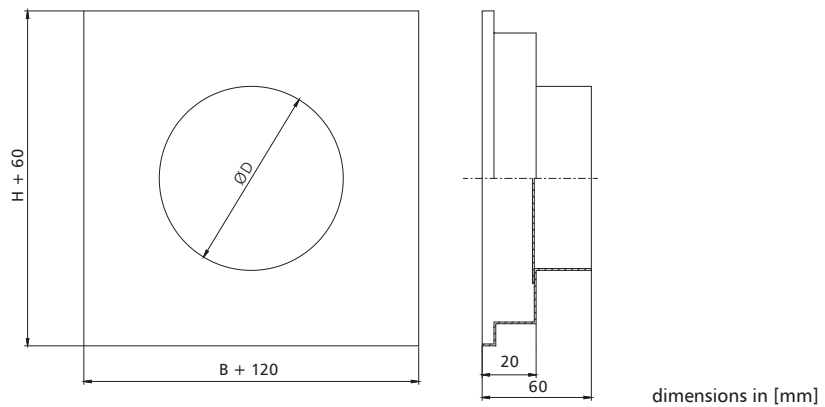
12.8.1 | mcr KRP connection stub

Mcr KRP connection stubs are used to connect a circular ventilation duct to a rectangular damper. The connection is a „bare end“ pipe. The diameter of the stub pipe is 2 mm smaller than the diameter of the ventilation duct.

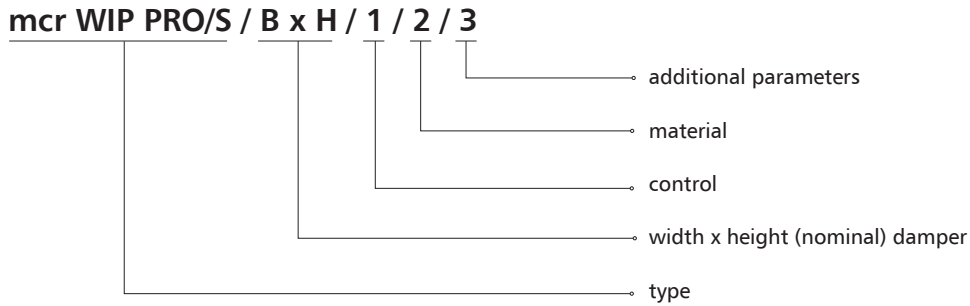
Dimensions:

BxH - damper dimensions [mm]

ØD - diameter of the connection duct [mm]



12.9 | Marking



1 - control:

» **KW1 trigger control mechanism**

- KW1/S – thermal trigger
- KW1/S/WK2 – thermal trigger + limit switch (open/closed blade signal)
- KW1/24I – thermal trigger + “pulse” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
- KW1/24P – thermal trigger + “break” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
- KW1/230I – thermal trigger + “pulse” electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
- KW1/230P – thermal trigger + “break” electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)

» **trigger control mechanism**

- BF24-T, BF24-TN – actuator with a return spring, U = 24 V AC/DC
- BF230-T, BF230-TN – actuator with a return spring, U = 230 V AC
- BF24TL-T-ST, BF24TL-TN-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, BF24-TN-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
- MF24T – thermal trigger
- MF230T – thermal trigger + limit switch (open/closed blade signal)
- MLF24T – thermal trigger
- MLF230T – thermal trigger + limit switch (open/closed blade signal)

2 - material:

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

3 - additional parameters :

» **Thermoelectric and thermal triggers**

- [no symbol] – 72°C trigger
- ZBAT95 – thermoelectric trigger for 95°C
- T93-95 – thermal trigger for 95°C
- T2-95 (MLF / MF) – thermal trigger for 95°C

» **Damper axis of rotation**

- [no symbol] – horizontal axis of rotation
- PP_D – vertical axis of rotation – mechanism at the bottom of the damper
- PP_G – vertical axis of rotation - mechanism at the top of the damper

» **Design standard**

- [no symbol] – left damper
- KP – right damper
- LC - actuator long casing

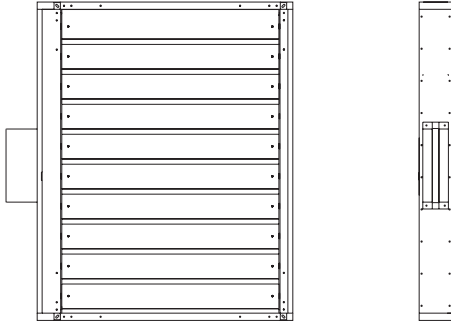
NOTE: separate additional parameters entered with the “/” sign example marking:

mcr WIP PRO/S 400 x 400 BFL24-T
E1120 louvered cut-off damper with a 24 V actuator with limit switches.

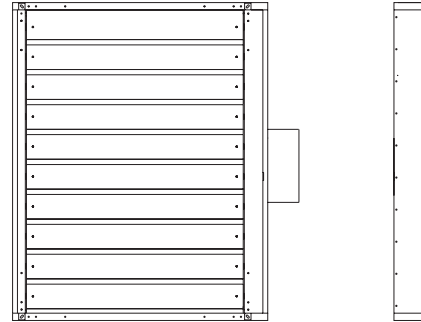
12.9.1 | Design standard

» mcr WIP PRO/S damper with actuator

» left damper standard



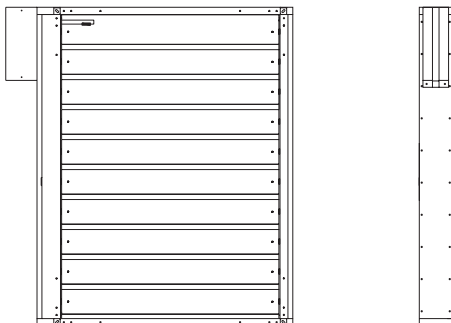
» right damper



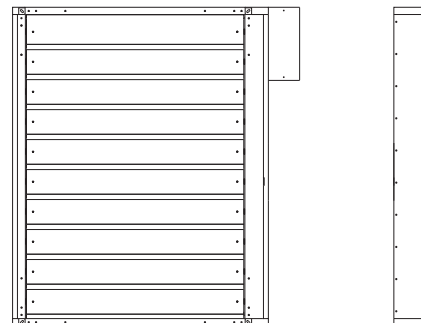
installation in reversed horizontal and vertical position possible

» mcr WIP PRO/S damper with KW1 mechanism

» left damper standard



» right damper

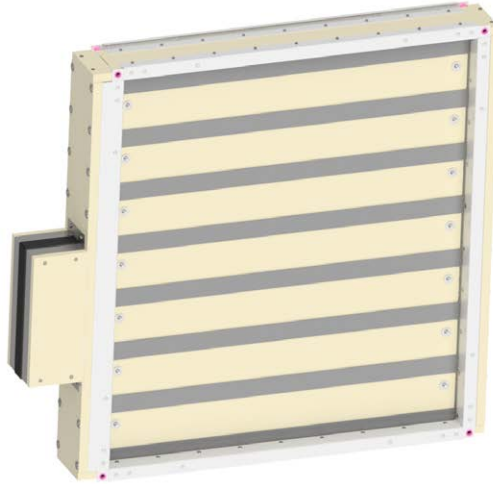


installation in reversed horizontal and vertical position possible

Chapter 16 - power supply and control (p. 262) contains the following information:
- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper.



downloadable models
on the website
under the designer zone tab



- » **EI120, EI180**
- » Fire resistance class: EI120 ($v_e i \leftrightarrow o$)S, EI90 ($h_o i \leftrightarrow o$)S, E120 ($h_o i \leftrightarrow o$)S.
- » Certificate of constancy of performance 2434-CPR-0031.
- » Dampers qualified under EN 15650-3 and tested under EN 1366-2.
- » Narrow louvered transfer damper.

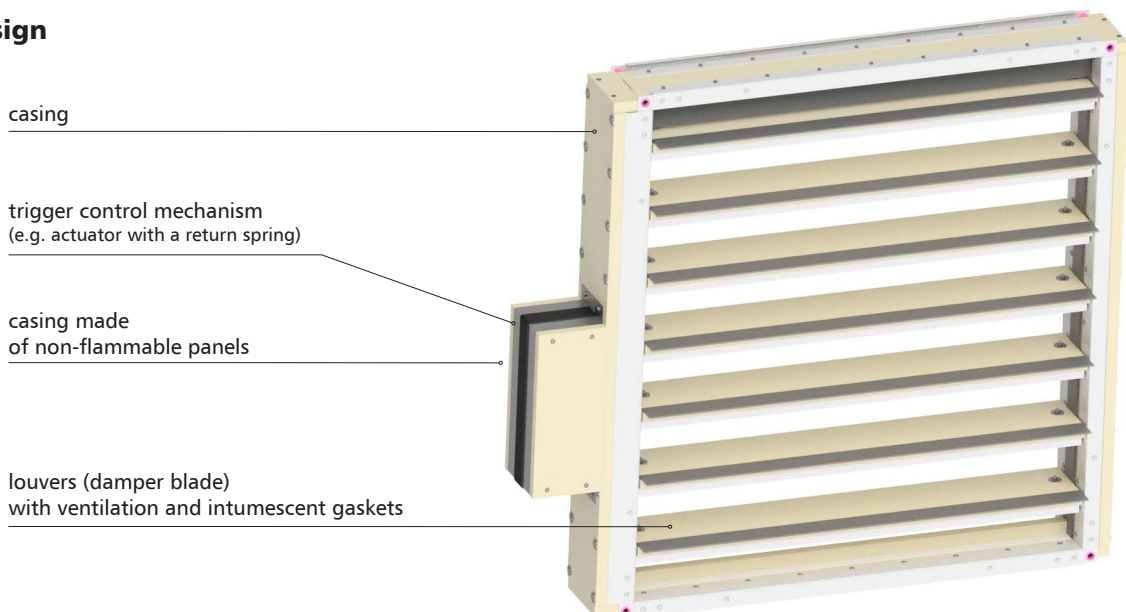
13.1| Application

mcr WIP PRO/T transfer dampers are intended for installation in fire ventilation systems. They are installed in fire partitions without connecting ventilation ducts and retain their fire resistance rating during the fire. During normal operation, damper blades are open, which enables the supply of fresh air to egress routes, protecting them from smoke, or to the space where air exchange or supply through vertical construction partitions is required. It is possible to use a closed transfer damper, in which the louvers open to transfer compensation air upon the receipt of an alarm signal from the fire signaling centre.

In the version designed for explosion hazard zones (EX version), the dampers can be operated in gas explosion hazard zone 1 inside and outside ventilation ducts and in dust explosion hazard zone 21 outside these ducts. The dampers have been certified in compliance with the ATEX directive 94/9/EC and meet the requirements of group II category 2G and -/2D:

- » II 2G Ex h IIC T6 Gb
 - » II -/2D Ex h IIIC T72° -/Db
- Ambient temperature: Ta: -20° ... +50° C

13.2| Design



The mcr WIP PRO/T transfer damper consists of a rectangular casing made of two steel sections connected with a non-combustible plate using rivets and galvanized steel sheet fasteners, a set of movable blades rotating around their axes and a trigger control mechanism. The damper casing is made of fire resistant panels and galvanized "C" shape metal sheet profiles. The device is reinforced on both sides with steel flat bar corners. Intumescent and ventilation gaskets are installed on the inside of the damper. Each damper blade is made of two fire resistant panels with a thickness of 20 mm each, which are displaced against each other. An intumescent gasket and ventilation gasket are attached with staples along the entire blade length. The damper blades revolve on their own axes, which consist of two steel pins. Each pin is mounted in a brass sleeve installed on the vertical side H of the fire damper casing.

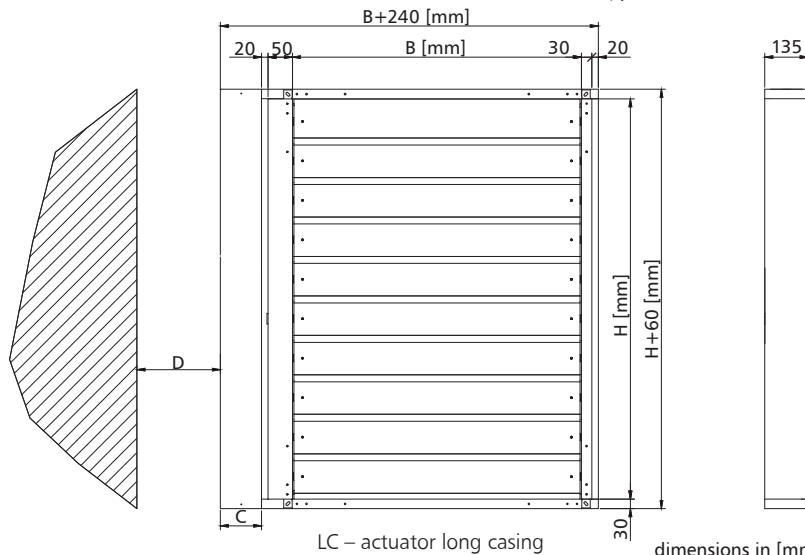
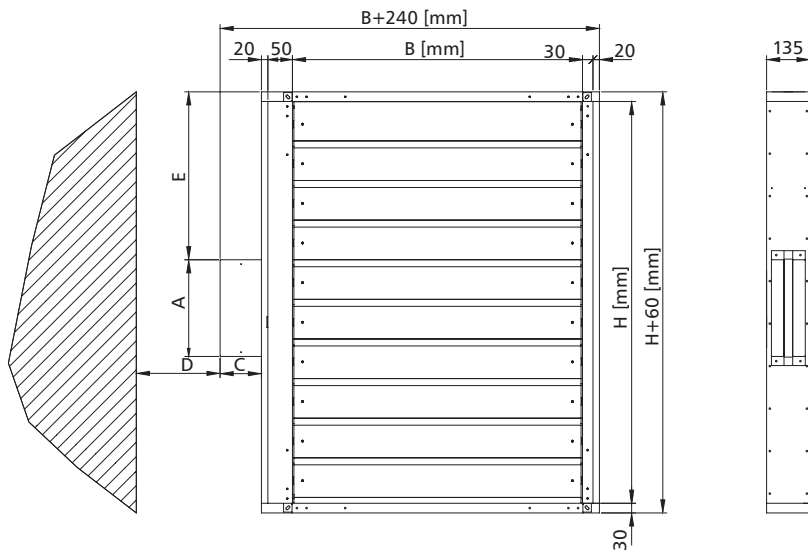
13.3 | Versions

13.3.1 | Damper closing and opening with an actuator

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

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

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



mechanic	A	C	D	E
BF, BFL, BFN	298	120	75	formula
EXBF	400	175	75	formula
MLF, MF	298	120	75	formula

for an even number of blades
$E \text{ [mm]} = (H/2 - 123) + 30$
for an odd number of blades
$E \text{ [mm]} = (H/2 - 61,5) + 30$

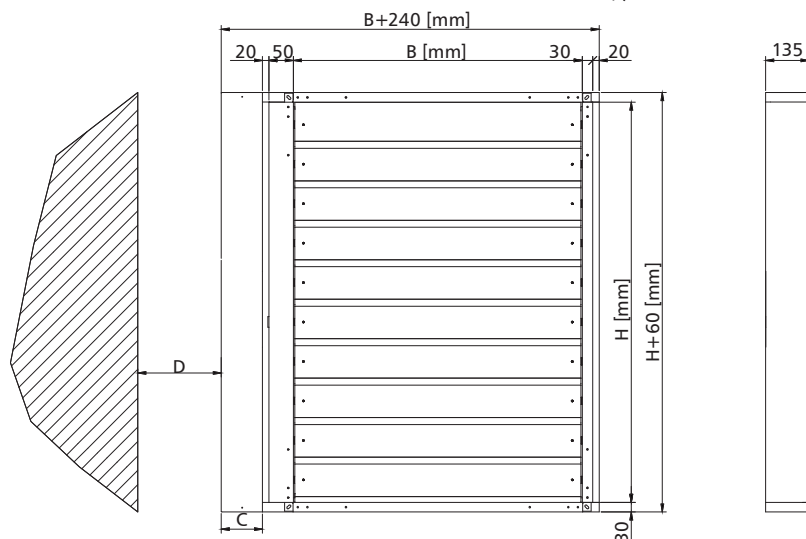
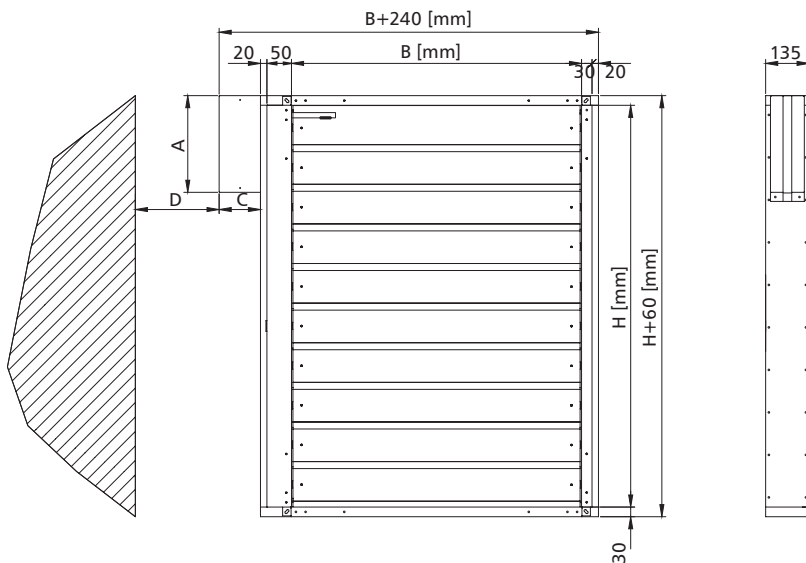
Number of blades = $H/123$

insert symmetrically against the wall axis

13.3.2 | The transfer fire damper with a spring drive and an integrated thermal trigger, optionally equipped with an electromagnetic trigger and limit switches.

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

mcr WIP PRO/T dampers are equipped with a KW1 trigger control mechanism with a drive spring and a cam-lever system. A 74°C thermal trigger (optionally 95°C) is integrated into the damper mechanism. Once the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. A mechanical blade position indicator is placed on the KW1 mechanism. 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. The mechanism features a test and blade button-release functions. Blade re-opening is activated manually.



mechanism	A	C	D
KW1	298	120	75

insert symmetrically against the wall axis

dimensions in [mm]

13.4 | Dimensions

» **Rectangular dampers:**

- » nominal width B: from 110 mm to 900 mm
- » nominal height H from 270 mm to 1250 mm
- » maximum single damper cross-section surface up to 1.125 m²

Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 10 mm increments within the given ranges).

Square dampers may also be additionally equipped with round connection collars allowing for so called “bare end” connection to round ducts.

13.5 | Installation

Rectangular mcr WIP PRO/T fire dampers are class E180(v_e i↔o) rated if installed in concrete partitions with a min. thickness of 120 mm, partitions made of full bricks or aerated concrete blocks with a min. thickness of 120 mm or light walls with E1120 or higher fire resistance rating.

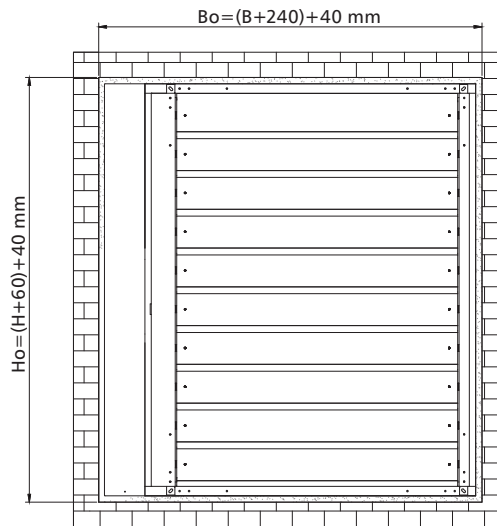
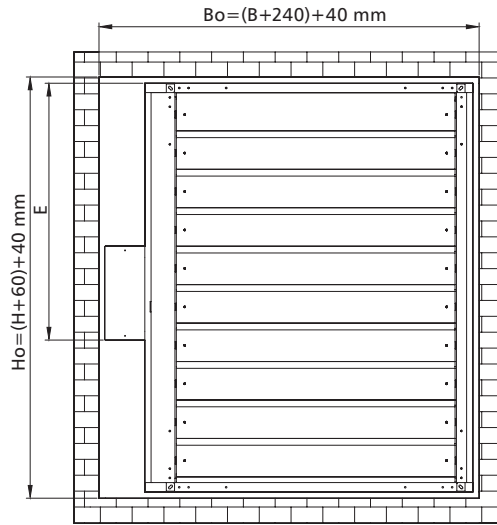
13.5.1 | Preparation of installation openings

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

Preferred

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

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



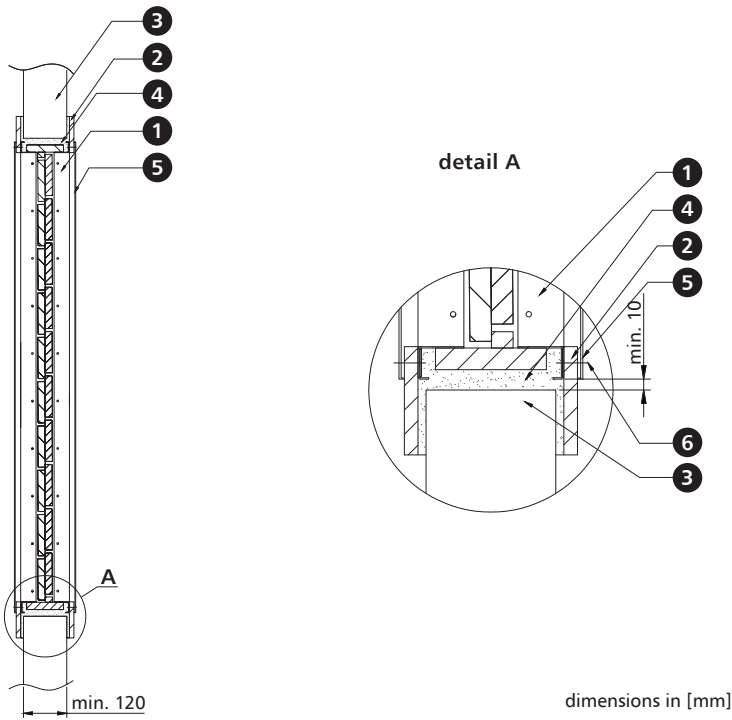
LC – actuator long casing

dimensions in [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 an even number of blades	for an odd number of blades
BF, BFL, BFN, MLF, MF	$E \text{ [mm]} = (H/2 - 123) + 30$	$E \text{ [mm]} = (H/2 - 61,5) + 30$
KW1	$E \text{ [mm]} = 0$	$E \text{ [mm]} = 0$

13.5.2 | Sample installation in concrete block or full brick walls

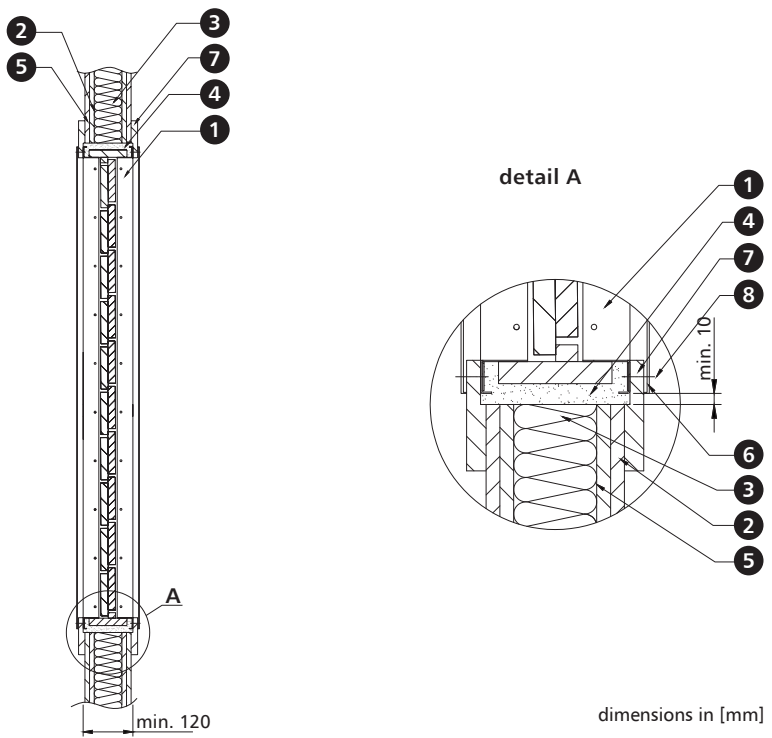


- 1. mcr WIP PRO/T fire damper
- 2. gypsum board trim 100 x 12.5 mm
- 3. solid wall, min. 120 mm
- 4. sealing – e.g. masonry mortar*
- 5. masking element
- 6. M8 bolt

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

The system masking element has the thickness of 5 mm. The masking element may be made of galvanized or stainless steel and painted in any RAL color (RAL 9010 as a standard).

13.5.3 | Sample installation in light walls



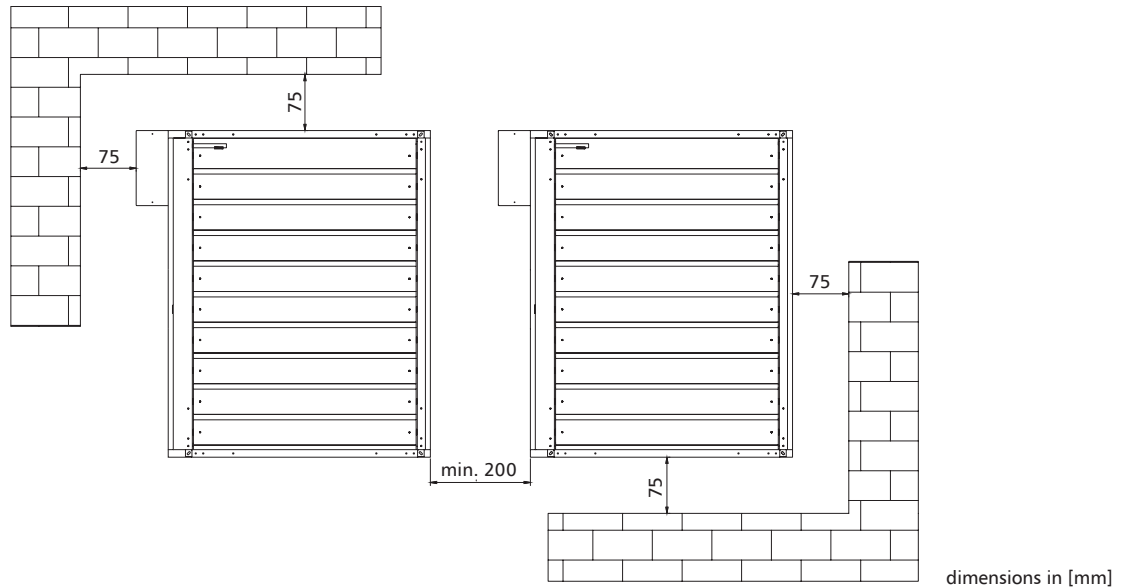
- 1. mcr WIP PRO/T fire damper
- 2. gypsum board trim 100 x 12.5 mm
- 3. mineral wool
- 4. mounting grout (e.g. gypsum)*
- 5. structural profile
- 6. masking element
- 7. gypsum board trim 100 x 12.5 mm
- 8. M8 bolt

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

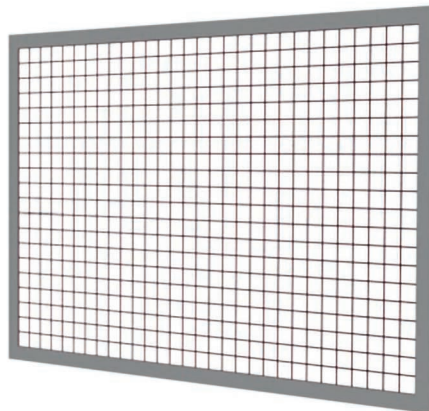
» Damper installation with a vertical louver rotation axis

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

» Distance between systems and partitions



13.5.4 | MWP system masking elements



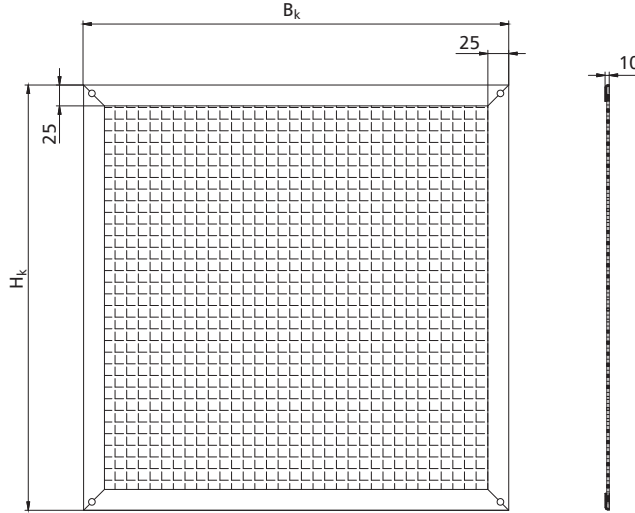
MWP masking elements are designed to fulfill either supply or exhaust function. They enable the transfer of air through construction partitions. They come with a fixed steel mesh that covers the damper, reducing its visibility.

Bolts are used to attach the masking element body to the damper. Such a solution allows for installing the product even in the most visually-demanding applications. The masking elements are painted in RAL 9010 as a standard (available in any colour from the RAL range on request).

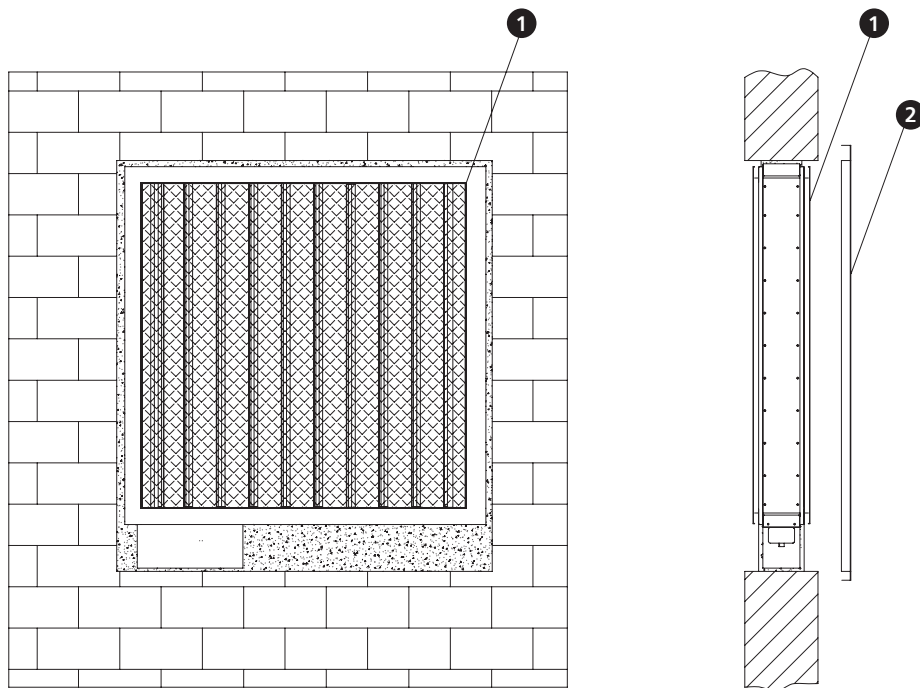
dimensions:

- » nominal width B_k : from 200 mm to 950 mm
- » nominal height H_k from 200 mm to 1300 mm
- » nominal thickness 10 mm

Apart from the standard dimensions, masking elements may be manufactured with intermediate dimensions.



» sample installation



1. MWP mesh cover
2. decorative grille (any, e.g. as indicated by the architect)

13.5.5 | MWP masking elements technical parameters

B_k – nominal width [mm]
 H_k – nominal height [mm]
 v – velocity [m/s]

S_e – damper active cross-section [m²]
 S_k – duct cross-section [m²]

Q – flow [m³/h]
 d_p – pressure drop [Pa]

		height H_k [mm]																
		200				300				400				500				
		v [m/s]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]
width B_k [mm]	200	4	0.040	0.028	409	8	0.060	0.043	613	8	0.080	0.057	818	8	0.100	0.071	1 022	8
		6			613	17			920	17			1 227	17			1 534	17
		8			818	31			1 227	31			1 636	31			2 045	31
		10			1 022	48			1 534	48			2 045	48			2 556	48
	300	4	0.060	0.043	613	8	0.090	0.064	920	8	0.120	0.085	1 227	8	0.150	0.107	1 534	8
		6			920	17			1 380	17			1 840	17			2 300	17
		8			1 227	31			1 840	31			2 454	31			3 067	31
		10			1 534	48			2 300	48			3 067	48			3 834	48
	400	4	0.080	0.057	818	8	0.120	0.085	1 227	8	0.160	0.114	1 636	8	0.200	0.142	2 045	8
		6			1 227	17			1 840	17			2 454	17			3 067	17
		8			1 636	31			2 454	31			3 272	31			4 090	31
		10			2 045	48			3 067	48			4 090	48			5 112	48
	500	4	0.100	0.071	1 022	8	0.150	0.107	1 534	8	0.200	0.142	2 045	8	0.250	0.178	2 556	8
		6			1 534	17			2 300	17			3 067	17			3 834	17
		8			2 045	31			3 067	31			4 090	31			5 112	31
		10			2 556	48			3 834	48			5 112	48			6 390	48
	600	4	0.120	0.085	1 227	8	0.180	0.128	1 840	8	0.240	0.170	2 454	8	0.300	0.213	3 067	8
		6			1 840	17			2 760	17			3 681	17			4 601	17
		8			2 454	31			3 681	31			4 908	31			6 134	31
		10			3 067	48			4 601	48			6 134	48			7 668	48
	700	4	0.140	0.099	1 431	8	0.210	0.149	2 147	8	0.280	0.199	2 863	8	0.350	0.249	3 578	8
		6			2 147	17			3 221	17			4 294	17			5 368	17
		8			2 863	31			4 294	31			5 725	31			7 157	31
		10			3 578	48			5 368	48			7 157	48			8 946	48
	800	4	0.160	0.114	1 636	8	0.240	0.170	2 454	8	0.320	0.227	3 272	8	0.400	0.284	4 090	8
		6			2 454	17			3 681	17			4 908	17			6 134	17
		8			3 272	31			4 908	31			6 543	31			8 179	31
		10			4 090	48			6 134	48			8 179	48			10 224	48
	900	4	0.180	0.128	1 840	8	0.270	0.192	2 760	8	0.360	0.256	3 681	8	0.450	0.320	4 601	8
		6			2 760	17			4 141	17			5 521	17			6 901	17
		8			3 681	31			5 521	31			7 361	31			9 202	31
		10			4 601	48			6 901	48			9 202	48			11 502	48

B_k – nominal width [mm]
 H_k – nominal height [mm]
 v – velocity [m/s]

S_e – damper active cross-section [m²]
 S_k – duct cross-section [m²]

Q – flow [m³/h]
 d_p – pressure drop [Pa]

		height H_k [mm]																
		600				700				800				900				
		v [m/s]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]
width B_k [mm]	200	4			1 227	8			1 431	8			1 636	8			1 840	8
		6	0.120	0.085	1 840	17	0.140	0.099	2 147	17	0.160	0.114	2 454	17	0.180	0.128	2 760	17
		8			2 454	31			2 863	31			3 272	31			3 681	31
		10			3 067	48			3 578	48			4 090	48			4 601	48
	300	4			1 840	8			2 147	8			2 454	8			2 760	8
		6	0.180	0.128	2 760	17	0.210	0.149	3 221	17	0.240	0.170	3 681	17	0.270	0.192	4 141	17
		8			3 681	31			4 294	31			4 908	31			5 521	31
		10			4 601	48			5 368	48			6 134	48			6 901	48
	400	4			2 454	8			2 863	8			3 272	8			3 681	8
		6	0.240	0.170	3 681	17	0.280	0.199	4 294	17	0.320	0.227	4 908	17	0.360	0.256	5 521	17
		8			4 908	31			5 725	31			6 543	31			7 361	31
		10			6 134	48			7 157	48			8 179	48			9 202	48
	500	4			3 067	8			3 578	8			4 090	8			4 601	8
		6	0.300	0.213	4 601	17	0.350	0.249	5 368	17	0.400	0.284	6 134	17	0.450	0.320	6 901	17
		8			6 134	31			7 157	31			8 179	31			9 202	31
		10			7 668	48			8 946	48			10 224	48			11 502	48
	600	4			3 681	8			4 294	8			4 908	8			5 521	8
		6	0.360	0.256	5 521	17	0.420	0.298	6 441	17	0.480	0.341	7 361	17	0.540	0.383	8 281	17
		8			7 361	31			8 588	31			9 815	31			11 042	31
		10			9 202	48			10 735	48			12 269	48			13 802	48
	700	4			4 294	8			5 010	8			5 725	8			6 441	8
		6	0.420	0.298	6 441	17	0.490	0.348	7 515	17	0.560	0.398	8 588	17	0.630	0.447	9 662	17
		8			8 588	31			10 020	31			11 451	31			12 882	31
		10			10 735	48			12 524	48			14 314	48			16 103	48
	800	4			4 908	8			5 725	8			6 543	8			7 361	8
		6	0.480	0.341	7 361	17	0.560	0.398	8 588	17	0.640	0.454	9 815	17	0.720	0.511	11 042	17
		8			9 815	31			11 451	31			13 087	31			14 723	31
		10			12 269	48			14 314	48			16 358	48			18 403	48
	900	4			5 521	8			6 441	8			7 361	8			8 281	8
		6	0.540	0.383	8 281	17	0.630	0.447	9 662	17	0.720	0.511	11 042	17	0.810	0.575	12 422	17
		8			11 042	31			12 882	31			14 723	31			16 563	31
		10			13 802	48			16 103	48			18 403	48			20 704	48

B_k – nominal width [mm]
 H_k – nominal height [mm]
 v – velocity [m/s]

S_e – damper active cross-section [m²]
 S_k – duct cross-section [m²]

Q – flow [m³/h]
 d_p – pressure drop [Pa]

		height H_k [mm]												
		1000				1100				1250				
		v [m/s]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]
width B_k [mm]	200	4	0.200	0.142	2 045	8	0.220	0.156	2 249	8	0.250	0.178	2 556	8
		6			3 067	17			3 374	17			3 834	17
		8			4 090	31			4 499	31			5 112	31
		10			5 112	48			5 623	48			6 390	48
	300	4	0.300	0.213	3 067	8	0.330	0.234	3 374	8	0.375	0.266	3 834	8
		6			4 601	17			5 061	17			5 751	17
		8			6 134	31			6 748	31			7 668	31
		10			7 668	48			8 435	48			9 585	48
	400	4	0.400	0.284	4 090	8	0.440	0.312	4 499	8	0.500	0.355	5 112	8
		6			6 134	17			6 748	17			7 668	17
		8			8 179	31			8 997	31			10 224	31
		10			10 224	48			11 246	48			12 780	48
500	4	0.500	0.355	5 112	8	0.550	0.391	5 623	8	0.625	0.444	6 390	8	
	6			7 668	17			8 435	17			9 585	17	
	8			10 224	31			11 246	31			12 780	31	
	10			12 780	48			14 058	48			15 975	48	
600	4	0.600	0.426	6 134	8	0.660	0.469	6 748	8	0.750	0.533	7 668	8	
	6			9 202	17			10 122	17			11 502	17	
	8			12 269	31			13 496	31			15 336	31	
	10			15 336	48			16 870	48			19 170	48	
700	4	0.700	0.497	7 157	8	0.770	0.547	7 872	8	0.875	0.621	8 946	8	
	6			10 735	17			11 809	17			13 419	17	
	8			14 314	31			15 745	31			17 892	31	
	10			17 892	48			19 681	48			22 365	48	
800	4	0.800	0.568	8 179	8	0.880	0.625	8 997	8	1.000	0.710	10 224	8	
	6			12 269	17			13 496	17			15 336	17	
	8			16 358	31			17 994	31			20 448	31	
	10			20 448	48			22 493	48			25 560	48	
900	4	0.900	0.639	9 202	8	0.990	0.703	10 122	8	1.125	0.799	11 502	8	
	6			13 802	17			15 183	17			17 253	17	
	8			18 403	31			20 244	31			23 004	31	
	10			23 004	48			25 304	48			28 755	48	

13.5.6 | MST system masking elements



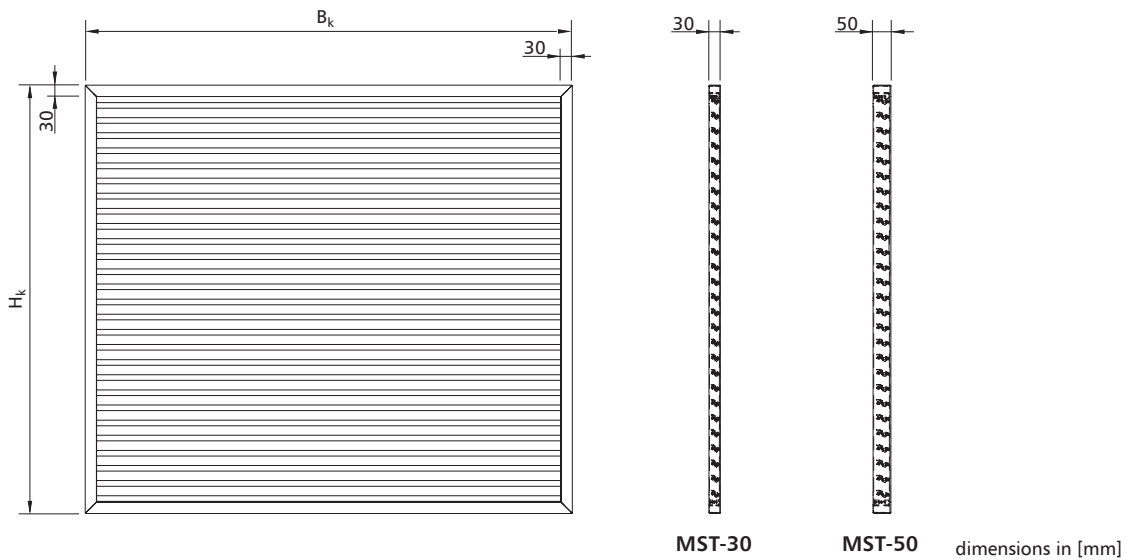
MST system masking elements are designed to fulfill either supply or exhaust function. They enable the transfer of air through construction partitions. They come with fixed steel louvers with a 40 mm span, obscuring damper visibility.

Bolts embedded in the body are used to attach the masking element body. After installation, an outer frame is mounted on the masking element body so that the holes and bolts cannot be seen from the outside. Such a solution allows for installing the product even in the most visually-demanding applications. The masking elements are painted in RAL 9010 as a standard (available in any colour from the RAL range on request).

dimensions:

- » nominal width B_k : from 200 mm to 1500 mm
- » nominal height H_k from 200 mm to 1500 mm
- » nominal thickness G 30 and 50 mm

Apart from the standard dimensions, masking elements may be manufactured with intermediate dimensions.



13.5.7 | MST masking element technical parameters

B_k – nominal width [mm]
 H_k – nominal height [mm]

v – velocity [m/s]
 S_e – damper active cross-section [m²]

Q – flow [m³/h]
 d_p – pressure drop [Pa]

		height H_k [mm]												
		200				300			400			500		
		v [m/s]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]
width B_k [mm]	200	4		210	12		403	10		596	9		789	9
		6	0.015	315	27	0.028	605	23	0.041	894	21	0.055	1 184	20
		8		420	49		806	41		1 192	37		1 578	35
		10		526	76		1 008	64		1 490	58		1 973	54
	4	0.028		402	10		0.051	734		8	0.074		1 067	7
	300	6	603	23	1 102	19	1 601	17	2 134	29	2 668	46	3 499	42
		8	804	41	1 469	33	2 134	29	2 668	46	3 499	42	3 499	42
		10	1 004	64	1 836	52	2 668	46	3 499	42	3 499	42	3 499	42
		4	0.041	593	9	0.074	1 066	7	0.107	1 538	6	0.140	2 010	6
	400	6	890	21	1 598	17	2 307	14	3 076	26	3 845	40	5 026	36
		8	1 187	37	2 131	29	3 076	26	3 845	40	5 026	36	5 026	36
		10	1 483	58	2 664	46	3 845	40	5 026	36	5 026	36	5 026	36
		4	0.055	785	9	0.097	1 397	7	0.140	2 009	6	0.182	2 621	5
	500	6	1 177	20	2 095	15	3 013	13	4 018	23	5 022	36	6 552	33
		8	1 570	35	2 794	27	4 018	23	5 022	36	6 552	36	6 552	33
		10	1 962	55	3 492	42	5 022	36	6 552	36	6 552	36	6 552	33
		4	0.068	976	8	0.120	1 728	6	0.172	2 480	5	0.224	3 231	5
	600	6	1 464	19	2 592	14	3 720	12	4 959	22	6 199	34	8 078	30
		8	1 953	33	3 456	26	4 959	22	6 199	34	8 078	34	8 078	30
		10	2 441	52	4 320	40	6 199	34	8 078	34	8 078	34	8 078	30
		4	0.081	1 168	8	0.143	2 059	6	0.205	2 951	5	0.267	3 842	5
	700	6	1 752	18	3 089	14	4 426	12	5 901	21	7 376	32	9 605	29
		8	2 336	32	4 118	25	5 901	21	7 376	32	9 605	32	9 605	29
		10	2 920	50	5 148	38	7 376	32	9 605	32	9 605	32	9 605	29
		4	0.094	1 359	8	0.166	2 390	6	0.238	3 421	5	0.309	4 452	4
	800	6	2 039	18	3 586	13	5 132	11	6 843	20	8 554	31	11 131	27
		8	2 719	31	4 781	24	6 843	20	8 554	31	11 131	31	11 131	27
		10	3 398	49	5 976	37	8 554	31	11 131	31	11 131	31	11 131	27
		4	0.108	1 551	8	0.189	2 722	6	0.270	3 892	5	0.352	5 063	4
	900	6	2 326	17	4 082	13	5 838	11	7 785	19	9 731	30	12 658	26
		8	3 102	31	5 443	23	7 785	19	9 731	30	12 658	30	12 658	26
		10	3 877	48	6 804	36	9 731	30	12 658	30	12 658	30	12 658	26
		4	0.121	1 742	8	0.212	3 053	6	0.303	4 363	5	0.394	5 674	4
	1000	6	2 614	17	4 579	13	6 545	10	8 726	19	10 908	29	14 184	25
		8	3 485	30	6 106	23	8 726	19	10 908	29	14 184	29	14 184	25
		10	4 356	47	7 632	35	10 908	29	14 184	29	14 184	29	14 184	25
		4	0.134	1 934	7	0.235	3 384	6	0.336	4 834	5	0.436	6 284	4
	1100	6	2 901	17	5 076	12	7 251	10	9 668	18	12 085	28	15 710	25
		8	3 868	30	6 768	22	9 668	18	12 085	28	15 710	28	15 710	25
		10	4 835	47	8 460	35	12 085	28	15 710	28	15 710	28	15 710	25
		4	0.148	2 125	7	0.258	3 715	5	0.368	5 305	4	0.479	6 895	4
	1200	6	3 188	17	5 573	12	7 957	10	10 610	18	13 262	28	17 237	24
		8	4 251	30	7 430	22	10 610	18	13 262	28	17 237	28	17 237	24
		10	5 314	46	9 288	34	13 262	28	17 237	28	17 237	28	17 237	24
		4	0.161	2 317	7	0.281	4 046	5	0.401	5 776	4	0.521	7 505	4
	1300	6	3 475	16	6 070	12	8 664	10	11 552	18	14 440	27	18 763	24
		8	4 634	29	8 093	21	11 552	18	14 440	27	18 763	27	18 763	24
		10	5 792	46	10 116	34	14 440	27	18 763	27	18 763	27	18 763	24
4		0.174	2 508	7	0.304	4 378	5	0.434	6 247	4	0.564	8 116	4	
1400	6	3 763	16	6 566	12	9 370	10	12 493	17	15 617	27	20 290	23	
	8	5 017	29	8 755	21	12 493	17	15 617	27	20 290	27	20 290	23	
	10	6 271	45	10 944	33	15 617	27	20 290	27	20 290	27	20 290	23	
	4	0.188	2 700	7	0.327	4 709	5	0.467	6 718	4	0.606	8 726	4	
1500	6	4 050	16	7 063	12	10 076	10	13 435	17	16 794	27	21 816	23	
	8	5 400	29	9 418	21	13 435	17	16 794	27	21 816	27	21 816	23	
	10	6 750	45	11 772	33	16 794	27	21 816	27	21 816	27	21 816	23	

B_k – nominal width [mm]
 H_k – nominal height [mm]

v – velocity [m/s]
 S_e – damper active cross-section [m²]

Q – flow [m³/h]
 d_p – pressure drop [Pa]

		height H_k [mm]												
		600				700			800			900		
		v [m/s]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]
width B_k [mm]	200	4		982	8		1 175	8		1 368	8		1 558	8
		6	0.068	1 473	19	0.082	1 763	18	0.095	2 052	18	0.108	2 337	17
		8		1 964	33		2 350	32		2 736	31		3 116	31
		10		2 455	52		2 938	50		3 420	49		3 895	48
	4	1 732		6	2 065		6	2 398		6	2 726		6	
	6	2 598	14	3 097	14	3 596	13	4 089	13					
	8	3 465	25	4 130	24	4 795	24	5 452	23					
	10	4 331	40	5 162	38	5 994	37	6 815	36					
	4	2 483	5	2 955	5	3 427	5	3 894	5					
	6	3 724	12	4 432	12	5 141	11	5 841	11					
	8	4 965	22	5 910	21	6 854	20	7 788	19					
	10	6 206	34	7 387	32	8 568	31	9 734	30					
	4	3 233	5	3 845	5	4 457	4	5 062	4					
	6	4 849	11	5 767	10	6 685	10	7 592	9					
	8	6 466	19	7 690	18	8 914	17	10 123	17					
	10	8 082	30	9 612	28	11 142	27	12 654	26					
	4	3 983	4	4 735	4	5 486	4	6 229	4					
	6	5 975	10	7 102	9	8 230	9	9 344	9					
	8	7 966	18	9 469	17	10 973	16	12 459	15					
	10	9 958	28	11 837	26	13 716	25	15 574	24					
	4	4 733	4	5 625	4	6 516	4	7 397	4					
	6	7 100	9	8 437	9	9 774	8	11 096	8					
	8	9 467	17	11 249	16	13 032	15	14 795	14					
	10	11 833	26	14 062	24	16 290	23	18 493	22					
	4	5 484	4	6 515	4	7 546	3	8 565	3					
	6	8 225	9	9 772	8	11 318	8	12 848	8					
	8	10 967	16	13 029	15	15 091	14	17 130	13					
	10	13 709	25	16 286	23	18 864	22	21 413	21					
	4	6 234	4	7 404	4	8 575	3	9 733	3					
	6	9 351	9	11 107	8	12 863	7	14 599	7					
	8	12 468	15	14 809	14	17 150	13	19 466	13					
	10	15 584	24	18 511	22	21 438	21	24 332	20					
	4	6 984	4	8 294	3	9 605	3	10 901	3					
	6	10 476	8	12 442	8	14 407	7	16 351	7					
	8	13 968	15	16 589	14	19 210	13	21 802	12					
	10	17 460	23	20 736	21	24 012	20	27 252	19					
	4	7 734	4	9 184	3	10 634	3	12 069	3					
	6	11 601	8	13 776	7	15 952	7	18 103	7					
	8	15 468	14	18 369	13	21 269	12	24 137	12					
	10	19 336	22	22 961	21	26 586	19	30 172	18					
	4	8 484	3	10 074	3	11 664	3	13 236	3					
	6	12 727	8	15 111	7	17 496	7	19 855	6					
	8	16 969	14	20 148	13	23 328	12	26 473	11					
	10	21 211	22	25 186	20	29 160	19	33 091	18					
	4	9 235	3	10 964	3	12 694	3	14 404	3					
	6	13 852	8	16 446	7	19 040	7	21 606	6					
	8	18 469	14	21 928	13	25 387	12	28 809	11					
	10	23 087	21	27 410	20	31 734	18	36 011	17					
4	9 985	3	11 854	3	13 723	3	15 572	3						
6	14 977	8	17 781	7	20 585	6	23 358	6						
8	19 970	13	23 708	12	27 446	11	31 144	11						
10	24 962	21	29 635	19	34 308	18	38 930	17						
4	10 735	3	12 744	3	14 753	3	16 740	3						
6	16 103	7	19 116	7	22 129	6	25 110	6						
8	21 470	13	25 488	12	29 506	11	33 480	11						
10	26 838	21	31 860	19	36 882	18	41 850	17						

B_k – nominal width [mm]
H_k – nominal height [mm]

v – velocity [m/s]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

		height H _k [mm]												
		1000				1100			1200			1300		
		v [m/s]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]
width B _k [mm]	200	4	0.122	1 751	8	0.135	1 944	7	0.148	2 137	7	0.162	2 330	7
		6		2 627	17		2 916	17		3 205	16		3 495	16
		8		3 502	30		3 888	30		4 274	29		4 660	29
		10		4 378	47		4 860	46		5 342	46		5 825	45
	300	4	0.212	3 059	6	0.236	3 391	5	0.259	3 724	5	0.282	4 056	5
		6		4 588	13		5 087	12		5 586	12		6 085	12
		8		6 117	22		6 782	22		7 448	22		8 113	21
		10		7 646	35		8 478	34		9 310	34		10 141	33
	400	4	0.303	4 366	5	0.336	4 838	5	0.369	5 311	4	0.402	5 783	4
		6		6 549	10		7 258	10		7 966	10		8 675	10
		8		8 732	19		9 677	18		10 621	18		11 566	17
		10		10 915	29		12 096	28		13 277	28		14 458	27
	500	4	0.394	5 674	4	0.437	6 286	4	0.479	6 898	4	0.522	7 510	4
		6		8 510	9		9 428	9		10 346	9		11 264	9
		8		11 347	16		12 571	16		13 795	15		15 019	15
		10		14 184	25		15 714	25		17 244	24		18 774	24
	600	4	0.485	6 981	4	0.537	7 733	4	0.589	8 484	3	0.641	9 236	3
		6		10 472	8		11 599	8		12 727	8		13 854	8
		8		13 962	15		15 466	14		16 969	14		18 472	14
		10		17 453	23		19 332	22		21 211	22		23 090	21
	700	4	0.576	8 289	3	0.638	9 180	3	0.699	10 071	3	0.761	10 963	3
		6		12 433	8		13 770	7		15 107	7		16 444	7
		8		16 577	14		18 360	13		20 143	13		21 925	13
		10		20 722	21		22 950	21		25 178	20		27 407	20
	800	4	0.666	9 596	3	0.738	10 627	3	0.810	11 658	3	0.881	12 689	3
		6		14 394	7		15 941	7		17 487	7		19 034	7
		8		19 192	13		21 254	12		23 316	12		25 379	12
		10		23 990	20		26 568	19		29 146	19		31 723	18
	900	4	0.757	10 904	3	0.839	12 074	3	0.920	13 245	3	1.001	14 416	3
		6		16 356	7		18 112	7		19 868	6		21 624	6
		8		21 807	12		24 149	12		26 490	11		28 832	11
		10		27 259	19		30 186	18		33 113	18		36 040	17
	1000	4	0.848	12 211	3	0.939	13 522	3	1.030	14 832	3	1.121	16 142	3
		6		18 317	7		20 282	6		22 248	6		24 214	6
		8		24 422	12		27 043	11		29 664	11		32 285	11
		10		30 528	18		33 804	18		37 080	17		40 356	17
	1100	4	0.939	13 519	3	1.040	14 969	3	1.140	16 419	3	1.241	17 869	3
		6		20 278	6		22 453	6		24 628	6		26 803	6
		8		27 037	11		29 938	11		32 838	10		35 738	10
		10		33 797	18		37 422	17		41 047	16		44 672	16
	1200	4	1.030	14 826	3	1.140	16 416	3	1.250	18 006	3	1.361	19 596	2
		6		22 239	6		24 624	6		27 009	6		29 393	6
		8		29 652	11		32 832	10		36 012	10		39 191	10
		10		37 066	17		41 040	16		45 014	16		48 989	15
	1300	4	1.120	16 134	3	1.241	17 863	3	1.361	19 593	2	1.481	21 322	2
		6		24 201	6		26 795	6		29 389	6		31 983	5
		8		32 268	11		35 726	10		39 185	10		42 644	10
		10		40 334	17		44 658	16		48 982	15		53 305	15
1400	4	1.211	17 441	3	1.341	19 310	2	1.471	21 180	2	1.601	23 049	2	
	6		26 162	6		28 966	6		31 769	5		34 573	5	
	8		34 883	10		38 621	10		42 359	10		46 097	9	
	10		43 603	16		48 276	16		52 949	15		57 622	14	
1500	4	1.302	18 749	3	1.442	20 758	2	1.581	22 766	2	1.721	24 775	2	
	6		28 123	6		31 136	5		34 150	5		37 163	5	
	8		37 498	10		41 515	10		45 533	9		49 550	9	
	10		46 872	16		51 894	15		56 916	15		61 938	14	

B_k – nominal width [mm]
H_k – nominal height [mm]

v – velocity [m/s]
S_e – damper active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

		height H _k [mm]						
		1400			1500			
		v [m/s]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]
width B _k [mm]	200	4	0.175	2 523	7	0.189	2 716	7
		6		3 784	16		4 074	16
		8		5 046	29		5 432	29
		10		6 307	45		6 790	45
	300	4	0.305	4 389	5	0.328	4 722	5
		6		6 584	12		7 083	12
		8		8 778	21		9 444	21
		10		10 973	33		11 804	33
	400	4	0.434	6 255	4	0.467	6 728	4
		6		9 383	10		10 092	10
		8		12 511	17		13 455	17
		10		15 638	27		16 819	27
	500	4	0.564	8 122	4	0.607	8 734	4
		6		12 182	8		13 100	8
		8		16 243	15		17 467	15
		10		20 304	23		21 834	23
	600	4	0.694	9 988	3	0.746	10 740	3
		6		14 982	8		16 109	7
		8		19 976	13		21 479	13
		10		24 970	21		26 849	21
	700	4	0.823	11 854	3	0.885	12 745	3
		6		17 781	7		19 118	7
		8		23 708	12		25 491	12
		10		29 635	19		31 864	19
	800	4	0.953	13 720	3	1.024	14 751	3
		6		20 580	6		22 127	6
		8		27 441	11		29 503	11
		10		34 301	18		36 878	18
	900	4	1.082	15 587	3	1.164	16 757	3
		6		23 380	6		25 136	6
		8		31 173	11		33 515	11
		10		38 966	17		41 893	17
	1000	4	1.212	17 453	3	1.303	18 763	3
		6		26 179	6		28 145	6
		8		34 906	10		37 526	10
		10		43 632	16		46 908	16
	1100	4	1.342	19 319	2	1.442	20 769	2
		6		28 979	6		31 154	5
		8		38 638	10		41 538	10
		10		48 298	15		51 923	15
	1200	4	1.471	21 185	2	1.582	22 775	2
		6		31 778	5		34 163	5
		8		42 371	10		45 550	9
		10		52 963	15		56 938	15
	1300	4	1.601	23 052	2	1.721	24 781	2
		6		34 577	5		37 171	5
		8		46 103	9		49 562	9
		10		57 629	14		61 952	14
	1400	4	1.730	24 918	2	1.860	26 787	2
		6		37 377	5		40 180	5
		8		49 836	9		53 574	9
		10		62 294	14		66 967	14
	1500	4	1.860	26 784	2	2.000	28 793	2
		6		40 176	5		43 189	5
		8		53 568	9		57 586	9
		10		66 960	14		71 982	13

13.6 | mcr WIP PRO/T rectangular dampers technical parameters

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		270					300					350					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	110	4	0.030	0.019	269	13	33	0.033	0.019	269	14	34	0.039	0.019	269	16	36
		6			404	30	44			404	30	44			404	36	46
		8			539	53	51			539	54	52			539	63	54
		10			673	82	57			673	85	58			673	99	60
	150	4	0.041	0.026	367	13	35	0.045	0.026	367	14	35	0.053	0.026	367	16	37
		6			551	30	45			551	30	46			551	36	48
		8			734	53	53			734	54	53			734	63	55
		10			918	82	59			918	85	59			918	99	61
	200	4	0.054	0.034	490	13	36	0.060	0.034	490	14	36	0.070	0.034	490	16	38
		6			734	30	46			734	30	47			734	36	49
		8			979	53	54			979	54	54			979	63	56
		10			1 224	82	60			1 224	84	60			1 224	99	62
250	4	0.068	0.043	612	13	37	0.075	0.043	612	14	37	0.088	0.043	612	16	39	
	6			918	30	47			918	30	48			918	36	50	
	8			1 224	53	55			1 224	54	55			1 224	63	57	
	10			1 530	82	61			1 530	85	61			1 530	99	63	
300	4	0.081	0.051	734	13	38	0.090	0.051	734	14	38	0.105	0.051	734	16	40	
	6			1 102	30	48			1 102	30	49			1 102	36	51	
	8			1 469	53	56			1 469	54	56			1 469	63	58	
	10			1 836	82	62			1 836	85	62			1 836	99	64	
350	4	0.095	0.060	857	13	38	0.105	0.060	857	14	39	0.123	0.060	857	16	41	
	6			1 285	30	49			1 285	30	49			1 285	36	51	
	8			1 714	53	56			1 714	54	57			1 714	63	59	
	10			2 142	82	62			2 142	85	63			2 142	99	65	
400	4	0.108	0.068	979	13	39	0.120	0.068	979	14	39	0.140	0.068	979	16	41	
	6			1 469	30	49			1 469	30	50			1 469	36	52	
	8			1 958	53	57			1 958	54	57			1 958	63	59	
	10			2 448	82	63			2 448	84	63			2 448	99	65	
450	4	0.122	0.077	1 102	13	39	0.135	0.077	1 102	14	40	0.158	0.077	1 102	16	42	
	6			1 652	30	50			1 652	30	50			1 652	36	52	
	8			2 203	53	57			2 203	54	58			2 203	63	60	
	10			2 754	82	63			2 754	84	64			2 754	99	66	
500	4	0.135	0.085	1 224	13	40	0.150	0.085	1 224	14	40	0.175	0.085	1 224	16	42	
	6			1 836	30	50			1 836	30	51			1 836	36	53	
	8			2 448	53	58			2 448	54	58			2 448	63	60	
	10			3 060	82	64			3 060	85	64			3 060	99	66	
550	4	0.149	0.094	1 346	2	13	0.165	0.094	1 346	14	41	0.193	0.094	1 346	16	43	
	6			2 020	4	24			2 020	30	51			2 020	36	53	
	8			2 693	7	31			2 693	54	59			2 693	63	61	
	10			3 366	10	37			3 366	84	65			3 366	99	67	
600	4	0.162	0.102	1 469	13	41	0.180	0.102	1 469	14	41	0.210	0.102	1 469	16	43	
	6			2 203	30	51			2 203	30	52			2 203	36	54	
	8			2 938	53	59			2 938	54	59			2 938	63	61	
	10			3 672	82	65			3 672	85	65			3 672	99	67	
650	4	0.176	0.111	1 591	13	41	0.195	0.111	1 591	14	41	0.228	0.111	1 591	16	43	
	6			2 387	30	52			2 387	30	52			2 387	36	54	
	8			3 182	53	59			3 182	54	59			3 182	63	62	
	10			3 978	82	65			3 978	85	65			3 978	99	67	
700	4	0.189	0.119	1 714	13	41	0.210	0.119	1 714	14	42	0.245	0.119	1 714	16	44	
	6			2 570	30	52			2 570	30	52			2 570	36	54	
	8			3 427	53	59			3 427	54	60			3 427	63	62	
	10			4 284	82	65			4 284	85	66			4 284	99	68	
750	4	0.203	0.128	1 836	13	42	0.225	0.128	1 836	14	42	0.263	0.128	1 836	16	44	
	6			2 754	30	52			2 754	30	53			2 754	36	55	
	8			3 672	53	60			3 672	54	60			3 672	63	62	
	10			4 590	82	66			4 590	85	66			4 590	99	68	
800	4	0.216	0.136	1 958	13	42	0.240	0.136	1 958	14	42	0.280	0.136	1 958	16	44	
	6			2 938	30	52			2 938	30	53			2 938	36	55	
	8			3 917	53	60			3 917	54	60			3 917	63	62	
	10			4 896	82	66			4 896	84	66			4 896	99	68	
850	4	0.230	0.145	2 081	13	42	0.255	0.145	2 081	14	43	0.298	0.145	2 081	16	45	
	6			3 121	30	53			3 121	30	53			3 121	36	55	
	8			4 162	53	60			4 162	54	61			4 162	63	63	
	10			5 202	82	66			5 202	84	66			5 202	99	68	
900	4	0.243	0.153	2 203	13	42	0.270	0.153	2 203	14	43	0.315	0.153	2 203	16	45	
	6			3 305	30	53			3 305	30	53			3 305	36	55	
	8			4 406	53	60			4 406	54	61			4 406	63	63	
	10			5 508	82	66			5 508	84	67			5 508	99	69	

mcr WIP PRO/T | Multi-blade transfer fire dampers

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		390					450					520					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	110	4	0.043	0.028	401	12	34	0.050	0.028	401	14	36	0.057	0.037	532	12	35
		6			601	27	44			601	31	46			798	27	46
		8			802	47	52			802	55	54			1 064	48	53
		10			1 002	74	58			1 002	86	60			1 331	75	59
	150	4	0.059	0.038	546	12	35	0.068	0.038	546	14	37	0.078	0.050	726	12	36
		6			820	27	46			820	31	48			1 089	27	47
		8			1 093	47	53			1 093	55	55			1 452	48	54
		10			1 366	74	59			1 366	86	61			1 814	75	60
	200	4	0.078	0.051	729	12	36	0.090	0.051	729	14	38	0.104	0.067	968	12	38
		6			1 093	27	47			1 093	31	49			1 452	27	48
		8			1 457	47	54			1 457	55	56			1 935	48	56
		10			1 822	74	60			1 822	86	62			2 419	75	62
250	4	0.098	0.063	911	12	37	0.113	0.063	911	14	39	0.130	0.084	1 210	12	39	
	6			1 366	27	48			1 366	31	50			1 814	27	49	
	8			1 822	47	55			1 822	55	57			2 419	48	57	
	10			2 277	74	61			2 277	86	63			3 024	75	63	
300	4	0.117	0.076	1 093	12	38	0.135	0.076	1 093	14	40	0.156	0.101	1 452	12	39	
	6			1 639	27	49			1 639	31	51			2 177	27	50	
	8			2 186	47	56			2 186	55	58			2 903	48	57	
	10			2 732	74	62			2 732	86	64			3 629	75	63	
350	4	0.137	0.089	1 275	12	39	0.158	0.089	1 275	14	41	0.182	0.118	1 693	12	40	
	6			1 913	27	49			1 913	31	51			2 540	27	51	
	8			2 550	47	57			2 550	55	59			3 387	48	58	
	10			3 188	74	63			3 188	86	65			4 234	75	64	
400	4	0.156	0.101	1 457	12	39	0.180	0.101	1 457	14	41	0.208	0.134	1 935	12	41	
	6			2 186	27	50			2 186	31	52			2 903	27	51	
	8			2 915	47	57			2 915	55	59			3 871	48	59	
	10			3 643	74	63			3 643	86	65			4 838	75	65	
450	4	0.176	0.114	1 639	12	40	0.203	0.114	1 639	14	42	0.234	0.151	2 177	12	41	
	6			2 459	27	50			2 459	31	52			3 266	27	52	
	8			3 279	47	58			3 279	55	60			4 355	48	59	
	10			4 099	74	64			4 099	86	66			5 443	75	65	
500	4	0.195	0.127	1 822	12	40	0.225	0.127	1 822	14	42	0.260	0.168	2 419	12	42	
	6			2 732	27	51			2 732	31	53			3 629	27	52	
	8			3 643	47	58			3 643	55	60			4 838	48	60	
	10			4 554	74	64			4 554	86	66			6 048	75	66	
550	4	0.215	0.139	2 004	12	41	0.248	0.139	2 004	14	43	0.286	0.185	2 661	12	42	
	6			3 006	27	51			3 006	31	53			3 992	27	53	
	8			4 008	47	59			4 008	55	61			5 322	48	60	
	10			5 009	74	65			5 009	86	67			6 653	75	66	
600	4	0.234	0.152	2 186	12	41	0.270	0.152	2 186	14	43	0.312	0.202	2 903	12	42	
	6			3 279	27	52			3 279	31	54			4 355	27	53	
	8			4 372	47	59			4 372	55	61			5 806	48	61	
	10			5 465	74	65			5 465	86	67			7 258	75	66	
650	4	0.254	0.164	2 368	12	41	0.293	0.164	2 368	14	43	0.338	0.218	3 145	12	43	
	6			3 552	27	52			3 552	31	54			4 717	27	53	
	8			4 736	47	59			4 736	55	61			6 290	48	61	
	10			5 920	74	65			5 920	86	67			7 862	75	67	
700	4	0.273	0.177	2 550	12	42	0.315	0.177	2 550	14	44	0.364	0.235	3 387	12	43	
	6			3 825	27	52			3 825	31	54			5 080	27	54	
	8			5 100	47	60			5 100	55	62			6 774	48	61	
	10			6 376	74	66			6 376	86	68			8 467	75	67	
750	4	0.293	0.190	2 732	12	42	0.338	0.190	2 732	14	44	0.390	0.252	3 629	12	43	
	6			4 099	27	53			4 099	31	55			5 443	27	54	
	8			5 465	47	60			5 465	55	62			7 258	48	61	
	10			6 831	74	66			6 831	86	68			9 072	75	67	
800	4	0.312	0.202	2 915	12	42	0.360	0.202	2 915	14	43	0.416	0.269	3 871	12	43	
	6			4 372	27	53			4 372	31	54			5 806	27	54	
	8			5 829	47	60			5 829	55	61			7 741	48	61	
	10			7 286	74	66			7 286	86	67			9 677	75	67	
850	4	0.332	0.215	3 097	12	43	0.383	0.215	3 097	14	43	0.442	0.286	4 113	12	43	
	6			4 645	27	53			4 645	31	54			6 169	27	54	
	8			6 193	47	61			6 193	55	61			8 225	48	61	
	10			7 742	74	66			7 742	86	67			10 282	75	67	
900	4	0.351	0.228	3 279	12	43	0.405	0.228	3 279	14	43	0.468	0.302	4 355	12	43	
	6			4 918	27	53			4 918	31	54			6 532	27	54	
	8			6 558	47	61			6 558	55	61			8 709	48	61	
	10			8 197	74	67			8 197	86	67			10 886	75	67	

mcr WIP PRO/T | Multi-blade transfer fire dampers

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		550					640					650					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	110	4	0.061	0.037	532	13	36	0.070	0.046	664	11	35	0.072	0.046	664	12	36
		6			798	29	46			996	26	46			996	27	47
		8			1 064	51	54			1 327	46	53			1 327	48	54
		10			1 331	79	60			1 659	72	59			1 659	76	60
	150	4	0.083	0.050	726	13	37	0.096	0.063	905	11	37	0.098	0.063	905	12	37
		6			1 089	29	48			1 358	26	47			1 358	27	48
		8			1 452	51	55			1 810	46	55			1 810	48	56
		10			1 814	79	61			2 263	72	61			2 263	76	61
	200	4	0.110	0.067	968	13	38	0.128	0.084	1 207	11	38	0.130	0.084	1 207	12	39
		6			1 452	29	49			1 810	26	49			1 810	27	49
		8			1 935	51	56			2 413	46	56			2 413	48	57
		10			2 419	79	62			3 017	72	62			3 017	76	63
250	4	0.138	0.084	1 210	13	39	0.160	0.105	1 508	11	39	0.163	0.105	1 508	12	40	
	6			1 814	29	50			2 263	26	50			2 263	27	50	
	8			2 419	51	57			3 017	46	57			3 017	48	58	
	10			3 024	79	63			3 771	72	63			3 771	76	64	
300	4	0.165	0.101	1 452	13	40	0.192	0.126	1 810	11	40	0.195	0.126	1 810	12	41	
	6			2 177	29	51			2 715	26	50			2 715	27	51	
	8			2 903	51	58			3 620	46	58			3 620	48	59	
	10			3 629	79	64			4 525	72	64			4 525	76	64	
350	4	0.193	0.118	1 693	13	41	0.224	0.147	2 112	11	40	0.228	0.147	2 112	12	41	
	6			2 540	29	51			3 168	26	51			3 168	27	52	
	8			3 387	51	59			4 224	46	58			4 224	48	59	
	10			4 234	79	65			5 279	72	64			5 279	76	65	
400	4	0.220	0.134	1 935	13	41	0.256	0.168	2 413	11	41	0.260	0.168	2 413	12	42	
	6			2 903	29	52			3 620	26	52			3 620	27	52	
	8			3 871	51	59			4 827	46	59			4 827	48	60	
	10			4 838	79	65			6 034	72	65			6 034	76	66	
450	4	0.248	0.151	2 177	13	42	0.288	0.189	2 715	11	42	0.293	0.189	2 715	12	42	
	6			3 266	29	52			4 073	26	52			4 073	27	53	
	8			4 355	51	60			5 430	46	60			5 430	48	60	
	10			5 443	79	66			6 788	72	65			6 788	76	66	
500	4	0.275	0.168	2 419	13	42	0.320	0.210	3 017	11	42	0.325	0.210	3 017	12	43	
	6			3 629	29	53			4 525	26	53			4 525	27	53	
	8			4 838	51	60			6 034	46	60			6 034	48	61	
	10			6 048	79	66			7 542	72	66			7 542	76	67	
550	4	0.303	0.185	2 661	13	43	0.352	0.230	3 318	11	42	0.358	0.230	3 318	12	43	
	6			3 992	29	53			4 978	26	53			4 978	27	54	
	8			5 322	51	61			6 637	46	60			6 637	48	61	
	10			6 653	79	67			8 296	72	66			8 296	76	67	
600	4	0.330	0.202	2 903	13	43	0.384	0.251	3 620	11	43	0.390	0.251	3 620	12	44	
	6			4 355	29	54			5 430	26	53			5 430	27	54	
	8			5 806	51	61			7 240	46	61			7 240	48	62	
	10			7 258	79	67			9 050	72	67			9 050	76	67	
650	4	0.358	0.218	3 145	13	44	0.416	0.272	3 922	11	43	0.423	0.272	3 922	12	44	
	6			4 717	29	54			5 883	26	54			5 883	27	54	
	8			6 290	51	62			7 844	46	61			7 844	48	62	
	10			7 862	79	67			9 805	72	67			9 805	76	68	
700	4	0.385	0.235	3 387	13	44	0.448	0.293	4 224	11	43	0.455	0.293	4 224	12	44	
	6			5 080	29	54			6 335	26	54			6 335	27	55	
	8			6 774	51	62			8 447	46	61			8 447	48	62	
	10			8 467	79	68			10 559	72	67			10 559	76	68	
750	4	0.413	0.252	3 629	13	44	0.480	0.314	4 525	11	44	0.488	0.314	4 525	12	44	
	6			5 443	29	55			6 788	26	54			6 788	27	55	
	8			7 258	51	62			9 050	46	62			9 050	48	63	
	10			9 072	79	68			11 313	72	68			11 313	76	68	
800	4	0.440	0.269	3 871	13	44	0.512	0.335	4 827	11	44	0.520	0.335	4 827	12	44	
	6			5 806	29	55			7 240	26	55			7 240	27	55	
	8			7 741	51	62			9 654	46	62			9 654	48	63	
	10			9 677	79	68			12 067	72	68			12 067	76	68	
850	4	0.468	0.286	4 113	13	45	0.544	0.356	5 129	11	44	0.553	0.356	5 129	12	44	
	6			6 169	29	55			7 693	26	55			7 693	27	55	
	8			8 225	51	63			10 257	46	62			10 257	48	63	
	10			10 282	79	69			12 821	72	68			12 821	76	68	
900	4	0.495	0.302	4 355	13	45	0.576	0.377	5 430	11	45	0.585	0.377	5 430	12	44	
	6			6 532	29	56			8 145	26	52			8 145	27	55	
	8			8 709	51	63			10 860	46	60			10 860	48	63	
	10			10 886	79	69			13 576	72	65			13 576	76	68	

mcr WIP PRO/T | Multi-blade transfer fire dampers

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		700					760					800					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	110	4	0.077	0.046	664	14	38	0.084	0.055	795	12	37	0.088	0.055	795	10	34
		6			996	30	48			1 193	28	48			1 193	22	45
		8			1 327	54	56			1 590	50	55			1 590	40	52
		10			1 659	85	61			1 988	78	61			1 988	62	58
	150	4	0.105	0.063	905	14	39	0.114	0.075	1 084	12	39	0.120	0.075	1 084	10	36
		6			1 358	30	49			1 626	28	49			1 626	22	46
		8			1 810	54	57			2 169	50	57			2 169	40	54
		10			2 263	85	63			2 711	78	62			2 711	62	60
	200	4	0.140	0.084	1 207	14	40	0.152	0.100	1 446	12	40	0.160	0.100	1 446	10	37
		6			1 810	30	51			2 169	28	50			2 169	22	48
		8			2 413	54	58			2 892	50	58			2 892	40	55
		10			3 017	85	64			3 614	78	64			3 614	62	61
250	4	0.175	0.105	1 508	14	41	0.190	0.126	1 807	12	41	0.200	0.126	1 807	10	38	
	6			2 263	30	52			2 711	28	51			2 711	22	49	
	8			3 017	54	59			3 614	50	59			3 614	40	56	
	10			3 771	85	65			4 518	78	65			4 518	62	62	
300	4	0.210	0.126	1 810	14	42	0.228	0.151	2 169	12	42	0.240	0.151	2 169	10	39	
	6			2 715	30	53			3 253	28	52			3 253	22	49	
	8			3 620	54	60			4 337	50	60			4 337	40	57	
	10			4 525	85	66			5 422	78	66			5 422	62	63	
350	4	0.245	0.147	2 112	14	43	0.266	0.176	2 530	12	42	0.280	0.176	2 530	10	39	
	6			3 168	30	53			3 795	28	53			3 795	22	50	
	8			4 224	54	61			5 060	50	60			5 060	40	57	
	10			5 279	85	66			6 325	78	66			6 325	62	63	
400	4	0.280	0.168	2 413	14	43	0.304	0.201	2 892	12	43	0.320	0.201	2 892	10	40	
	6			3 620	30	54			4 337	28	53			4 337	22	51	
	8			4 827	54	61			5 783	50	61			5 783	40	58	
	10			6 034	85	67			7 229	78	67			7 229	62	64	
450	4	0.315	0.189	2 715	14	44	0.342	0.226	3 253	12	43	0.360	0.226	3 253	10	41	
	6			4 073	30	54			4 879	28	54			4 879	22	51	
	8			5 430	54	62			6 506	50	61			6 506	40	59	
	10			6 788	85	68			8 132	78	67			8 132	62	64	
500	4	0.350	0.210	3 017	14	44	0.380	0.251	3 614	12	44	0.400	0.251	3 614	10	41	
	6			4 525	30	55			5 422	28	54			5 422	22	52	
	8			6 034	54	62			7 229	50	62			7 229	40	59	
	10			7 542	85	68			9 036	78	68			9 036	62	65	
550	4	0.385	0.230	3 318	14	45	0.418	0.276	3 976	12	44	0.440	0.276	3 976	10	41	
	6			4 978	30	55			5 964	28	55			5 964	22	52	
	8			6 637	54	63			7 952	50	62			7 952	40	59	
	10			8 296	85	68			9 940	78	68			9 940	62	65	
600	4	0.420	0.251	3 620	14	45	0.456	0.301	4 337	12	45	0.480	0.301	4 337	10	42	
	6			5 430	30	56			6 506	28	55			6 506	22	52	
	8			7 240	54	63			8 675	50	63			8 675	40	60	
	10			9 050	85	69			10 843	78	69			10 843	62	66	
650	4	0.455	0.272	3 922	14	45	0.494	0.326	4 699	12	45	0.520	0.326	4 699	10	42	
	6			5 883	30	56			7 048	28	56			7 048	22	53	
	8			7 844	54	63			9 397	50	63			9 397	40	60	
	10			9 805	85	69			11 747	78	69			11 747	62	66	
700	4	0.490	0.293	4 224	14	46	0.532	0.351	5 060	12	45	0.560	0.351	5 060	10	42	
	6			6 335	30	56			7 590	28	56			7 590	22	53	
	8			8 447	54	64			10 120	50	63			10 120	40	61	
	10			10 559	85	69			12 650	78	69			12 650	62	66	
750	4	0.525	0.314	4 525	14	46	0.570	0.377	5 422	12	46	0.600	0.377	5 422	10	43	
	6			6 788	30	56			8 132	28	56			8 132	22	53	
	8			9 050	54	64			10 843	50	64			10 843	40	61	
	10			11 313	85	70			13 554	78	69			13 554	62	67	
800	4	0.560	0.335	4 827	14	44	0.608	0.402	5 783	12	46	0.640	0.402	5 783	10	43	
	6			7 240	30	55			8 675	28	56			8 675	22	54	
	8			9 654	54	62			11 566	50	64			11 566	40	61	
	10			12 067	85	67			14 458	78	70			14 458	62	67	
850	4	0.595	0.356	5 129	14	46	0.646	0.427	6 144	12	46	0.680	0.427	6 144	10	43	
	6			7 693	30	57			9 217	28	57			9 217	22	54	
	8			10 257	54	65			12 289	50	64			12 289	40	61	
	10			12 821	85	70			15 361	78	70			15 361	62	67	
900	4	0.630	0.377	5 430	14	47	0.684	0.452	6 506	12	46	0.720	0.452	6 506	10	44	
	6			8 145	30	57			9 759	28	57			9 759	22	54	
	8			10 860	54	65			13 012	50	64			13 012	40	62	
	10			13 576	85	71			16 265	78	70			16 265	62	67	

mcr WIP PRO/T | Multi-blade transfer fire dampers

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S_e – damper active cross-section [m²]

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

		height H [mm]															
		890					900					950					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	110	4			927	13	38			927	13	39			927	14	40
		6			1 390	29	49			1 390	30	49			1 390	32	50
		8	0.098	0.064	1 853	51	56	0.099	0.064	1 853	53	57	0.105	0.064	1 853	57	58
		10			2 317	79	62			2 317	83	63			2 317	89	64
	150	4			1 264	13	40			1 264	13	40			1 264	14	41
		6			1 895	29	50			1 895	30	51			1 895	32	52
		8	0.134	0.088	2 527	51	58	0.135	0.088	2 527	53	58	0.143	0.088	2 527	57	59
		10			3 159	79	63			3 159	83	64			3 159	89	65
	200	4			1 685	13	41			1 685	13	41			1 685	14	42
		6			2 527	29	51			2 527	30	52			2 527	32	53
		8	0.178	0.117	3 370	51	59	0.180	0.117	3 370	53	59	0.190	0.117	3 370	57	60
		10			4 212	79	65			4 212	83	65			4 212	89	66
250	4			2 106	13	42			2 106	13	42			2 106	14	43	
	6			3 159	29	52			3 159	30	53			3 159	32	54	
	8	0.223	0.146	4 212	51	60	0.225	0.146	4 212	53	60	0.238	0.146	4 212	57	61	
	10			5 265	79	66			5 265	83	66			5 265	89	67	
300	4			2 527	13	43			2 527	13	43			2 527	14	44	
	6			3 791	29	53			3 791	30	54			3 791	32	55	
	8	0.267	0.176	5 054	51	61	0.270	0.176	5 054	53	61	0.285	0.176	5 054	57	62	
	10			6 318	79	66			6 318	83	67			6 318	89	68	
350	4			2 948	13	43			2 948	13	44			2 948	14	45	
	6			4 423	29	54			4 423	30	54			4 423	32	55	
	8	0.312	0.205	5 897	51	61	0.315	0.205	5 897	53	62	0.333	0.205	5 897	57	63	
	10			7 371	79	67			7 371	83	68			7 371	89	69	
400	4			3 370	13	44			3 370	13	44			3 370	14	45	
	6			5 054	29	54			5 054	30	55			5 054	32	56	
	8	0.356	0.234	6 739	51	62	0.360	0.234	6 739	53	62	0.380	0.234	6 739	57	63	
	10			8 424	79	68			8 424	83	68			8 424	89	69	
450	4			3 791	13	44			3 791	13	45			3 791	14	46	
	6			5 686	29	55			5 686	30	55			5 686	32	56	
	8	0.401	0.263	7 582	51	62	0.405	0.263	7 582	53	63	0.428	0.263	7 582	57	64	
	10			9 477	79	68			9 477	83	69			9 477	89	70	
500	4			4 212	13	45			4 212	13	45			4 212	14	46	
	6			6 318	29	55			6 318	30	56			6 318	32	57	
	8	0.445	0.293	8 424	51	63	0.450	0.293	8 424	53	63	0.475	0.293	8 424	57	64	
	10			10 530	79	69			10 530	83	69			10 530	89	70	
550	4			4 633	13	45			4 633	13	46			4 633	14	47	
	6			6 950	29	56			6 950	30	56			6 950	32	57	
	8	0.490	0.322	9 266	51	63	0.495	0.322	9 266	53	64	0.523	0.322	9 266	57	65	
	10			11 583	79	69			11 583	83	70			11 583	89	70	
600	4			5 054	13	46			5 054	13	46			5 054	14	47	
	6			7 582	29	56			7 582	30	57			7 582	32	58	
	8	0.534	0.351	10 109	51	64	0.540	0.351	10 109	53	64	0.570	0.351	10 109	57	65	
	10			12 636	79	69			12 636	83	70			12 636	89	71	
650	4			5 476	13	46			5 476	13	46			5 476	14	47	
	6			8 213	29	56			8 213	30	57			8 213	32	58	
	8	0.579	0.380	10 951	51	64	0.585	0.380	10 951	53	65	0.618	0.380	10 951	57	65	
	10			13 689	79	70			13 689	83	70			13 689	89	71	
700	4			5 897	13	46			5 897	13	47			5 897	14	48	
	6			8 845	29	57			8 845	30	57			8 845	32	58	
	8	0.623	0.410	11 794	51	64	0.630	0.410	11 794	53	65	0.665	0.410	11 794	57	66	
	10			14 742	79	70			14 742	83	71			14 742	89	72	
750	4			6 318	13	47			6 318	13	47			6 318	14	48	
	6			9 477	29	57			9 477	30	58			9 477	32	59	
	8	0.668	0.439	12 636	51	65	0.675	0.439	12 636	53	65	0.713	0.439	12 636	57	66	
	10			15 795	79	70			15 795	83	71			15 795	89	72	
800	4			6 739	13	47			6 739	13	47			6 739	14	48	
	6			10 109	29	57			10 109	30	58			10 109	32	59	
	8	0.712	0.468	13 478	51	65	0.720	0.468	13 478	53	65	0.760	0.468	13 478	57	66	
	10			16 848	79	71			16 848	83	71			16 848	89	72	
850	4			7 160	13	47			7 160	13	48			7 160	14	49	
	6			10 741	29	58			10 741	30	58			10 741	32	59	
	8	0.757	0.497	14 321	51	65	0.765	0.497	14 321	53	66	0.808	0.497	14 321	57	67	
	10			17 901	79	71			17 901	83	71			17 901	89	72	
900	4			7 582	13	47			7 582	13	48			7 582	14	49	
	6			11 372	29	58			11 372	30	58			11 372	32	59	
	8	0.801	0.527	15 163	51	65	0.810	0.527	15 163	53	66	0.855	0.527	15 163	57	67	
	10			18 954	79	71			18 954	83	72			18 954	89	73	

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		1010					1050					1100					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	110	4	0.111	0.073	1 058	12	38	0.116	0.073	1 058	13	39	0.121	0.073	1 058	15	41
		6			1 587	28	49			1 587	29	49			1 587	33	51
		8			2 116	50	57			2 116	51	57			2 116	59	59
		10			2 645	77	62			2 645	79	63			2 645	93	65
	150	4	0.152	0.100	1 443	12	40	0.158	0.100	1 443	13	40	0.165	0.100	1 443	15	42
		6			2 164	28	50			2 164	29	51			2 164	33	53
		8			2 886	50	58			2 886	51	58			2 886	59	60
		10			3 607	77	64			3 607	79	64			3 607	93	66
	200	4	0.202	0.134	1 924	12	41	0.210	0.134	1 924	13	41	0.220	0.134	1 924	15	43
		6			2 886	28	52			2 886	29	52			2 886	33	54
		8			3 848	50	59			3 848	51	59			3 848	59	61
		10			4 810	77	65			4 810	79	65			4 810	93	67
250	4	0.253	0.167	2 405	12	42	0.263	0.167	2 405	13	42	0.275	0.167	2 405	15	44	
	6			3 607	28	53			3 607	29	53			3 607	33	55	
	8			4 810	50	60			4 810	51	60			4 810	59	62	
	10			6 012	77	66			6 012	79	66			6 012	93	68	
300	4	0.303	0.200	2 886	12	43	0.315	0.200	2 886	13	43	0.330	0.200	2 886	15	45	
	6			4 329	28	53			4 329	29	54			4 329	33	56	
	8			5 772	50	61			5 772	51	61			5 772	59	63	
	10			7 214	77	67			7 214	79	67			7 214	93	69	
350	4	0.354	0.234	3 367	12	43	0.368	0.234	3 367	13	44	0.385	0.234	3 367	15	46	
	6			5 050	28	54			5 050	29	54			5 050	33	56	
	8			6 733	50	62			6 733	51	62			6 733	59	64	
	10			8 417	77	67			8 417	79	68			8 417	93	70	
400	4	0.404	0.267	3 848	12	44	0.420	0.267	3 848	13	44	0.440	0.267	3 848	15	46	
	6			5 772	28	55			5 772	29	55			5 772	33	57	
	8			7 695	50	62			7 695	51	62			7 695	59	64	
	10			9 619	77	68			9 619	79	68			9 619	93	70	
450	4	0.455	0.301	4 329	12	45	0.473	0.301	4 329	13	45	0.495	0.301	4 329	15	47	
	6			6 493	28	55			6 493	29	55			6 493	33	57	
	8			8 657	50	63			8 657	51	63			8 657	59	65	
	10			10 822	77	68			10 822	79	69			10 822	93	71	
500	4	0.505	0.334	4 810	12	45	0.525	0.334	4 810	13	45	0.550	0.334	4 810	15	47	
	6			7 214	28	56			7 214	29	56			7 214	33	58	
	8			9 619	50	63			9 619	51	63			9 619	59	65	
	10			12 024	77	69			12 024	79	69			12 024	93	71	
550	4	0.556	0.367	5 291	12	45	0.578	0.367	5 291	13	46	0.605	0.367	5 291	15	48	
	6			7 936	28	56			7 936	29	56			7 936	33	58	
	8			10 581	50	63			10 581	51	64			10 581	59	66	
	10			13 226	77	69			13 226	79	70			13 226	93	72	
600	4	0.606	0.401	5 772	12	46	0.630	0.401	5 772	13	46	0.660	0.401	5 772	15	48	
	6			8 657	28	56			8 657	29	57			8 657	33	59	
	8			11 543	50	64			11 543	51	64			11 543	59	66	
	10			14 429	77	70			14 429	79	70			14 429	93	72	
650	4	0.657	0.434	6 252	12	46	0.683	0.434	6 252	13	46	0.715	0.434	6 252	15	48	
	6			9 379	28	57			9 379	29	57			9 379	33	59	
	8			12 505	50	64			12 505	51	65			12 505	59	67	
	10			15 631	77	70			15 631	79	70			15 631	93	72	
700	4	0.707	0.468	6 733	12	46	0.735	0.468	6 733	13	47	0.770	0.468	6 733	15	49	
	6			10 100	28	57			10 100	29	57			10 100	33	59	
	8			13 467	50	65			13 467	51	65			13 467	59	67	
	10			16 834	77	70			16 834	79	71			16 834	93	73	
750	4	0.758	0.501	7 214	12	47	0.788	0.501	7 214	13	47	0.825	0.501	7 214	15	49	
	6			10 822	28	57			10 822	29	58			10 822	33	60	
	8			14 429	50	65			14 429	51	65			14 429	59	67	
	10			18 036	77	71			18 036	79	71			18 036	93	73	
800	4	0.808	0.534	7 695	12	47	0.840	0.534	7 695	13	47	0.880	0.534	7 695	15	49	
	6			11 543	28	58			11 543	29	58			11 543	33	60	
	8			15 391	50	65			15 391	51	65			15 391	59	67	
	10			19 238	77	71			19 238	79	71			19 238	93	73	
850	4	0.859	0.568	8 176	12	47	0.893	0.568	8 176	13	48	0.935	0.568	8 176	15	50	
	6			12 264	28	58			12 264	29	58			12 264	33	60	
	8			16 353	50	65			16 353	51	66			16 353	59	68	
	10			20 441	77	71			20 441	79	72			20 441	93	74	
900	4	0.909	0.601	8 657	12	48	0.945	0.601	8 657	13	48	0.990	0.601	8 657	15	50	
	6			12 986	28	58			12 986	29	58			12 986	33	60	
	8			17 315	50	66			17 315	51	66			17 315	59	68	
	10			21 643	77	71			21 643	79	72			21 643	93	74	

mcr WIP PRO/T | Multi-blade transfer fire dampers

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		1130					1200					1250					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	110	4	0.124	0.083	1 190	12	39	0.132	0.083	1 190	13	40	0.138	0.092	1 321	11	37
		6			1 784	27	49			1 784	30	51			1 982	24	48
		8			2 379	49	57			2 379	54	58			2 642	43	55
		10			2 974	76	63			2 974	84	64			3 303	66	61
	150	4	0.170	0.113	1 622	12	40	0.180	0.113	1 622	13	41	0.188	0.125	1 801	11	39
		6			2 433	27	51			2 433	30	52			2 702	24	49
		8			3 244	49	58			3 244	54	59			3 603	43	57
		10			4 055	76	64			4 055	84	65			4 504	66	63
	200	4	0.226	0.150	2 163	12	41	0.240	0.150	2 163	13	42	0.250	0.167	2 402	11	39
		6			3 244	27	51			3 244	30	53			3 603	24	50
		8			4 326	49	59			4 326	54	60			4 804	43	57
		10			5 407	76	65			5 407	84	66			6 005	66	63
250	4	0.283	0.188	2 704	12	42	0.300	0.188	2 704	13	43	0.313	0.209	3 002	11	40	
	6			4 055	27	52			4 055	30	54			4 504	24	51	
	8			5 407	49	60			5 407	54	61			6 005	43	58	
	10			6 759	76	66			6 759	84	67			7 506	66	64	
300	4	0.339	0.225	3 244	12	43	0.360	0.225	3 244	13	44	0.375	0.250	3 603	11	41	
	6			4 866	27	53			4 866	30	54			5 404	24	51	
	8			6 489	49	61			6 489	54	62			7 206	43	59	
	10			8 111	76	66			8 111	84	68			9 007	66	65	
350	4	0.396	0.263	3 785	12	43	0.420	0.263	3 785	13	45	0.438	0.292	4 203	11	41	
	6			5 678	27	54			5 678	30	55			6 305	24	52	
	8			7 570	49	61			7 570	54	63			8 407	43	60	
	10			9 463	76	67			9 463	84	68			10 508	66	65	
400	4	0.452	0.300	4 326	12	44	0.480	0.300	4 326	13	45	0.500	0.334	4 804	11	42	
	6			6 489	27	54			6 489	30	56			7 206	24	53	
	8			8 652	49	62			8 652	54	63			9 608	43	60	
	10			10 814	76	68			10 814	84	69			12 010	66	66	
450	4	0.509	0.338	4 866	12	44	0.540	0.338	4 866	13	46	0.563	0.375	5 404	11	43	
	6			7 300	27	55			7 300	30	56			8 106	24	53	
	8			9 733	49	62			9 733	54	64			10 809	43	61	
	10			12 166	76	68			12 166	84	70			13 511	66	66	
500	4	0.565	0.376	5 407	12	45	0.600	0.376	5 407	13	46	0.625	0.417	6 005	11	43	
	6			8 111	27	55			8 111	30	57			9 007	24	54	
	8			10 814	49	63			10 814	54	64			12 010	43	61	
	10			13 518	76	69			13 518	84	70			15 012	66	67	
550	4	0.622	0.413	5 948	12	45	0.660	0.413	5 948	13	47	0.688	0.459	6 605	11	43	
	6			8 922	27	56			8 922	30	57			9 908	24	54	
	8			11 896	49	63			11 896	54	65			13 211	43	62	
	10			14 870	76	69			14 870	84	70			16 513	66	67	
600	4	0.678	0.451	6 489	12	46	0.720	0.451	6 489	13	47	0.750	0.500	7 206	11	44	
	6			9 733	27	56			9 733	30	57			10 809	24	54	
	8			12 977	49	64			12 977	54	65			14 412	43	62	
	10			16 222	76	69			16 222	84	71			18 014	66	68	
650	4	0.735	0.488	7 029	12	46	0.780	0.488	7 029	13	47	0.813	0.542	7 806	11	44	
	6			10 544	27	56			10 544	30	58			11 709	24	55	
	8			14 059	49	64			14 059	54	65			15 612	43	62	
	10			17 573	76	70			17 573	84	71			19 516	66	68	
700	4	0.791	0.526	7 570	12	46	0.840	0.526	7 570	13	48	0.875	0.584	8 407	11	44	
	6			11 355	27	57			11 355	30	58			12 610	24	55	
	8			15 140	49	64			15 140	54	66			16 813	43	63	
	10			18 925	76	70			18 925	84	71			21 017	66	68	
750	4	0.848	0.563	8 111	12	47	0.900	0.563	8 111	13	48	0.938	0.626	9 007	11	45	
	6			12 166	27	57			12 166	30	58			13 511	24	55	
	8			16 222	49	65			16 222	54	66			18 014	43	63	
	10			20 277	76	70			20 277	84	72			22 518	66	69	
800	4	0.904	0.601	8 652	12	47	0.960	0.601	8 652	13	48	1.000	0.667	9 608	11	45	
	6			12 977	27	57			12 977	30	59			14 412	24	56	
	8			17 303	49	65			17 303	54	66			19 215	43	63	
	10			21 629	76	71			21 629	84	72			24 019	66	69	
850	4	0.961	0.638	9 192	12	47	1.020	0.638	9 192	13	48	1.063	0.709	10 208	11	45	
	6			13 788	27	58			13 788	30	59			15 312	24	56	
	8			18 384	49	65			18 384	54	66			20 416	43	63	
	10			22 981	76	71			22 981	84	72			25 520	66	69	
900	4	1.017	0.676	9 733	12	47	1.080	0.676	9 733	13	49	1.125	0.751	10 809	11	46	
	6			14 599	27	58			14 599	30	59			16 213	24	56	
	8			19 466	49	65			19 466	54	67			21 617	43	64	
	10			24 332	76	71			24 332	84	73			27 022	66	69	

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

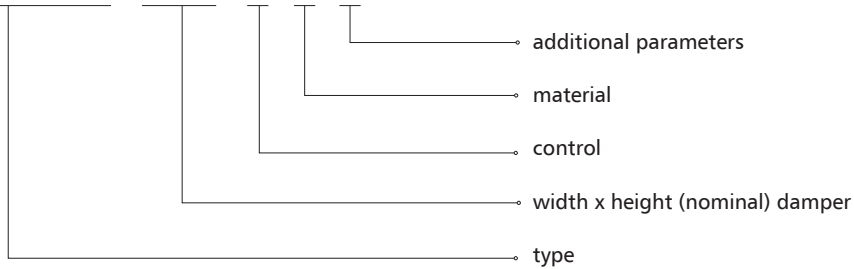
13.7 | Estimated weights of mcr WIP PRO/T dampers [kg]

		width B [mm]										
		263	300	400	500	600	700	800	900	1000	1100	1250
height H [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 trigger control mechanisms or actuators

13.8 | Marking

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



1 - control:

» **KW1 trigger control mechanism**

- KW1/S – thermal trigger
- KW1/S/WK2 – thermal trigger + limit switch (open/closed blade signal)
- KW1/24I – thermal trigger + “pulse” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
- KW1/24P – thermal trigger + “break” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
- KW1/230I – thermal trigger + “pulse” electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
- KW1/230P – thermal trigger + “break” electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)

» **trigger control mechanism**

- BF24-T, BF24-TN – actuator with a return spring, U = 24 V AC/DC
- BF230-T, BF230-TN – actuator with a return spring, U = 230 V AC
- BF24TL-T-ST, BF24TL-TN-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, BF24-TN-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
- MF24T – thermal trigger
- MF230T – thermal trigger + limit switch (open/closed blade signal)
- MLF24T – thermal trigger
- MLF230T – thermal trigger + limit switch (open/closed blade signal)

2 - material:

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

3 - additional parameters :

» **Thermoelectric and thermal triggers**

- [no symbol] – 72°C trigger
- ZBAT95 – thermoelectric trigger for 95°C
- T93-95 – thermal trigger for 95°C
- T2-95 (MLF/ MF) – thermal trigger for 95°C

» **Damper axis of rotation**

- [no symbol] – horizontal axis of rotation
- PP_D – vertical axis of rotation – mechanism at the bottom of the damper
- PP_G – vertical axis of rotation - mechanism at the top of the damper

» **Design standard**

- [no symbol] – left damper
- KP – right damper
- LC - actuator long casing

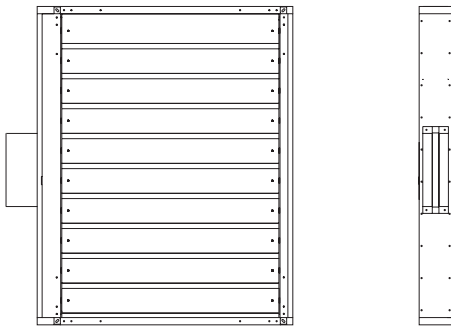
NOTE: separate additional parameters entered with the “/” sign example marking:

mcr WIP PRO/T 400 x 400 BFL24-T
E120 louvered cut-off damper with a 24 V actuator with limit switches.

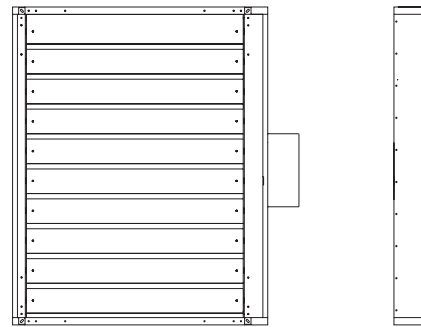
13.8.1 | Design standard

» **mcr WIP PRO/T damper with actuator**

» **left damper standard**



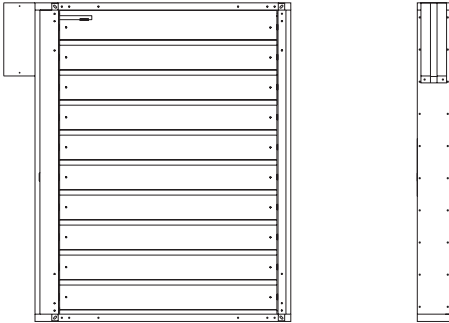
» **right damper**



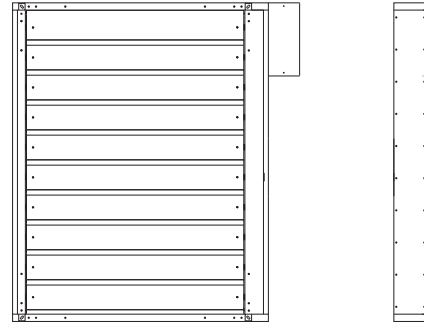
installation in reversed horizontal and vertical position possible

» mcr WIP PRO/T damper with KW1 mechanism

» left damper standard



» right damper



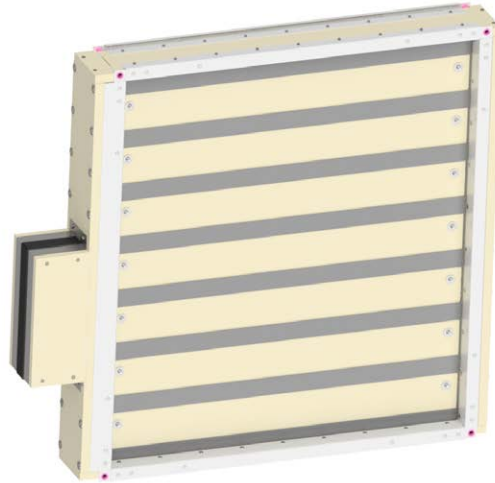
installation in reversed horizontal and vertical position possible

Chapter 16 - power supply and control (p. 262) contains the following information:
- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper.

mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems



downloadable models
on the website
under the designer zone tab



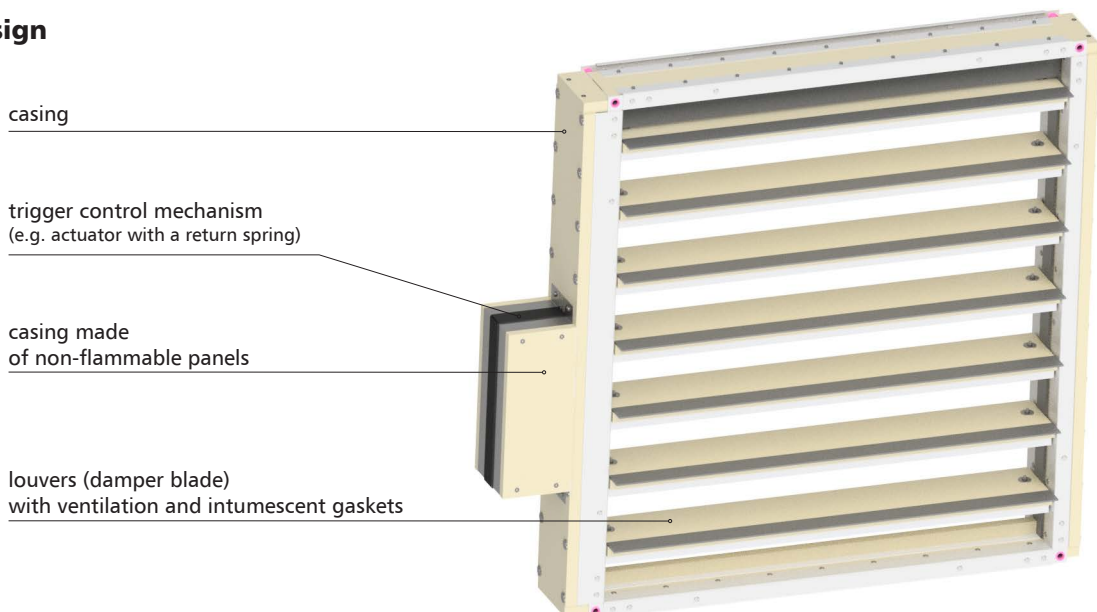
» EIS120, E₆₀₀ 120

- » Fire resistance class: EI120 (v_{ew} i↔o)S1000C₁₀₀₀AAmulti, EI120 (v_{ed} h_{od} i↔o)S1000C₁₀₀₀AAmulti.
- » Certificate of constancy of performance 2434-CPR-0031.
- » Dampers certified for compliance with EN 12101-8.
- » Dampers rated under EN 13501-4 and tested under EN 1366-10.
- » Narrow louvered smoke control dampers for fire ventilation systems.
- » Certified installation on smoke ventilation ducts.
- » Dampers certified for installation in batteries.

14.1 | Application

mcr WIP PRO/V, mcr WIP PRO/V-M multi-blade smoke control dampers are intended for installation in automatically operated fire ventilation systems. mcr WIP PRO/V dampers are used in fire ventilation systems, while dampers marked as mcr WIP PRO/V-M are used in mixed, fire and comfort ventilation systems. When installed, these devices prevent the propagation of fire, smoke and fire gases to adjacent areas. During normal operation, the fire damper blade is in the open or closed position, depending on its function. The fire damper blade in the fire compartment is opened, whereas in other areas the blades are closed. Admissible flow velocity in the connected duct is 12 m/s. Due to their design, mcr WIP PRO/V, mcr WIP PRO/V-M fire dampers are intended for use in systems, where the components such as a silencer, bend or supply and extraction grille are installed downstream of the smoke control damper. Dampers may be installed in smoke extract ducts, shafts and at system ends.

14.2 | Design



mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

The multi-blade mcr WIP PRO/V, mcr WIP PRO/V-M damper consists of a rectangular casing made of two steel sections connected with a non-combustible plate using rivets and galvanized steel sheet fasteners, a set of movable blades rotating around their axes and a trigger control mechanism. The damper casing is made of fire resistant panels and galvanized "C" shape metal sheet profiles. The device is reinforced on both sides with steel flat bar corners. Intumescent and ventilation gaskets are installed on the inside of the damper. Each damper blade is made of two fire resistant panels with a thickness of 20 mm each, which are displaced against each other. An intumescent gasket and ventilation gasket are attached with staples along the entire blade length. The damper blades revolve on their own axes, which consist of two steel pins. Each pin is mounted in a sleeve installed on the vertical side H of the fire damper casing.

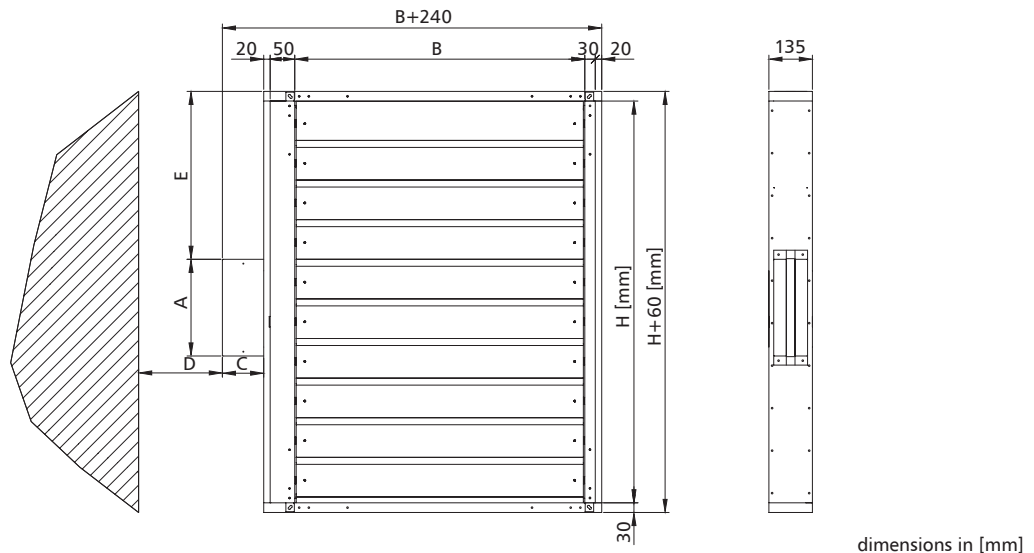
14.3 | Versions

14.3.1 | Damper closing and opening with an actuator

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

mcr WIP PRO/V, mcr WIP PRO/V-M smoke control damper are equipped with a trigger control mechanism in the form of a **BE, BEE BEN** axial actuator without the return spring (24 V AC/DC or 230 V AC). The BE, BEE, BEN series actuators are equipped with limit switches used to monitor the damper blade position. Furthermore, a mechanical position indicator is placed on the actuator.

mcr WIP PRO/V, mcr WIP PRO/V-M smoke control dampers with BE, BEE, BEN actuators can be opened/closed by supplying voltage to the actuator terminals. Dampers with those actuators may be opened/closed manually using a key.



insert symmetrically against the wall axis

mechanism	A	C	D	E
BE, BEE, BEN	298	120	75	formula

for an even number of blades
$E \text{ [mm]} = (H/2 - 123) + 30$
for an odd number of blades
$E \text{ [mm]} = (H/2 - 61,5) + 30$

Number of blades = $H/123$

14.4 | Dimensions

» Rectangular dampers:

- » nominal width B: from 110 mm to 1250 mm
- » nominal height H from 270 mm to 1250 mm
- » maximum single damper cross-section surface up to 1.5625 m²

Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (at 10 mm increments within the given ranges).

Square dampers may also be additionally equipped with round connection collars allowing for so called "bare end" connection to round ducts.

mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

14.5 | Installation

mcr WIP PRO/V rectangular dampers are rated EI120(v_{ew} i↔o)S1000C₁₀₀₀₀AAmulti if installed in wall/shaft partitions made of concrete, bricks, hollow bricks, masonry or prefabricated slabs with a min. thickness of 125 mm. The mcr WIP PRO/V rectangular dampers are rated EI120(v_{ew} i↔o)S1000C₁₀₀₀₀AAmulti if installed in yielding wall/shaft partitions made from gypsum board panels with the thickness of at least 125 mm.

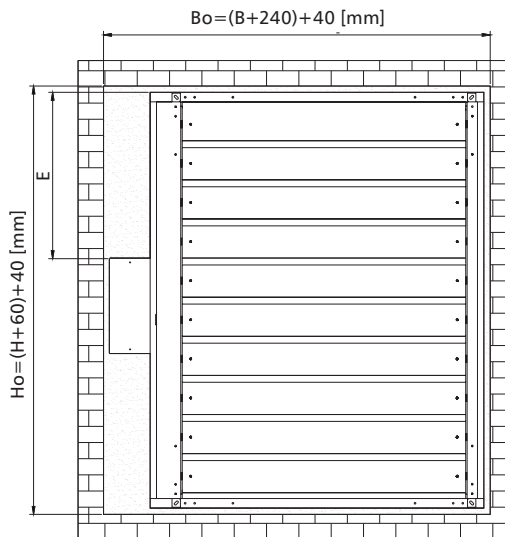
mcr WIP PRO/V rectangular dampers are rated EI120(v_{ed} h_{od} i↔o)S1000C₁₀₀₀₀AAmulti if installed in a fireproof duct compliant with EN 1366-8 or EN 1366-9, with fire resistances equal to or lesser than the fire resistance of the damper. The battery (set) composed of up to 4 rectangular dampers is rated EI120(v_{ew} i↔o)S1500C₁₀₀₀₀AAmulti if installed in solid partitions, partitions made of concrete, bricks or hollow bricks.

mcr WIP PRO/V rectangular dampers are rated E₆₀₀ 120 (v_{ed} i↔o) S1000C₁₀₀₀₀AA single in single-zone fire ventilation systems.

14.5.1 | 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:

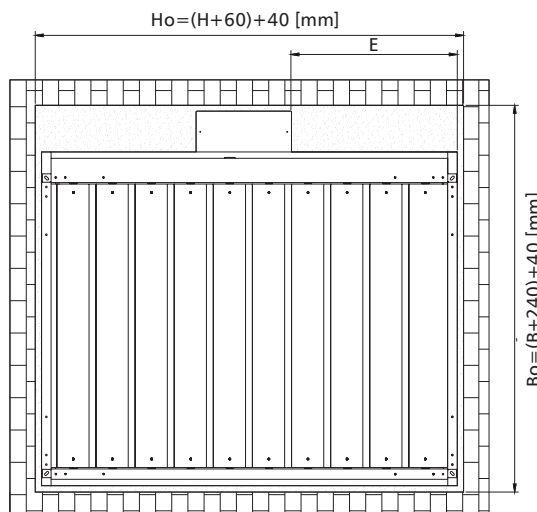
Preferred
 $B_o = (B + 240) + 40 \text{ mm}$
 $H_o = (H + 60) + 40 \text{ mm}$



v_{ew} damper with a horizontal rotation axis: 110 x 270 to 900 x 1250 [mm], also applicable for versions with LC casing

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:

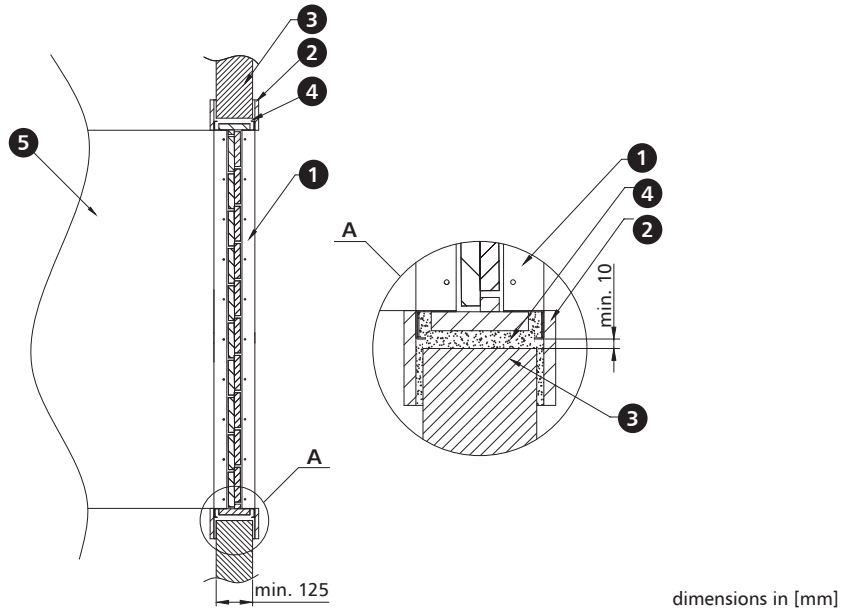
mechanism	for an even number of blades	for an odd number of blades
BE, BEE, BEN	$E \text{ [mm]} = (H/2 - 123) + 30$	$E \text{ [mm]} = (H/2 - 61,5) + 30$



v_{ew} damper with a vertical rotation axis: 110 x 270 to 1250 x 1250 [mm], also applicable for versions with LC casing

mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

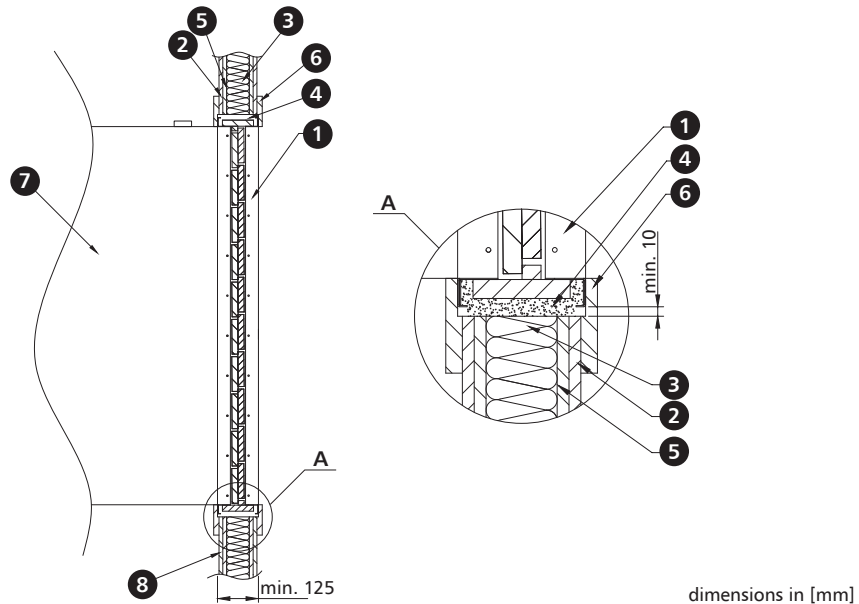
14.5.2 | Sample installation in concrete block or full brick walls



- 1. mcr WIP PRO/V smoke control damper
- 2. gypsum board trim 100 x 12.5 mm
- 3. solid wall
- 4. masonry mortar (e.g. gypsum)*
- 5. smoke ventilation duct

* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

14.5.3 | Sample installation in light walls

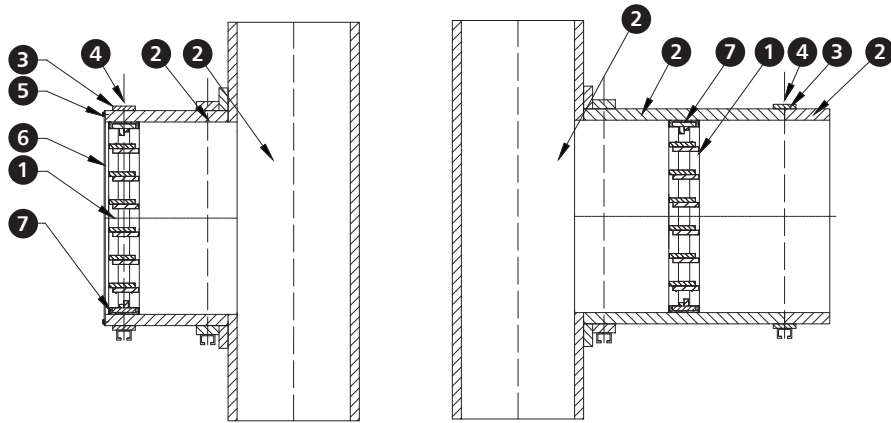


- 1. mcr WIP PRO/V smoke control damper
- 2. gypsum board 12.5 mm
- 3. mineral wool with a density of at least 80 kg/m³, A1 class
- 4. installation grout*
- 5. structural profile
- 6. gypsum board trim 100 x 12.5 mm
- 7. smoke ventilation duct
- 8. gypsum board light wall

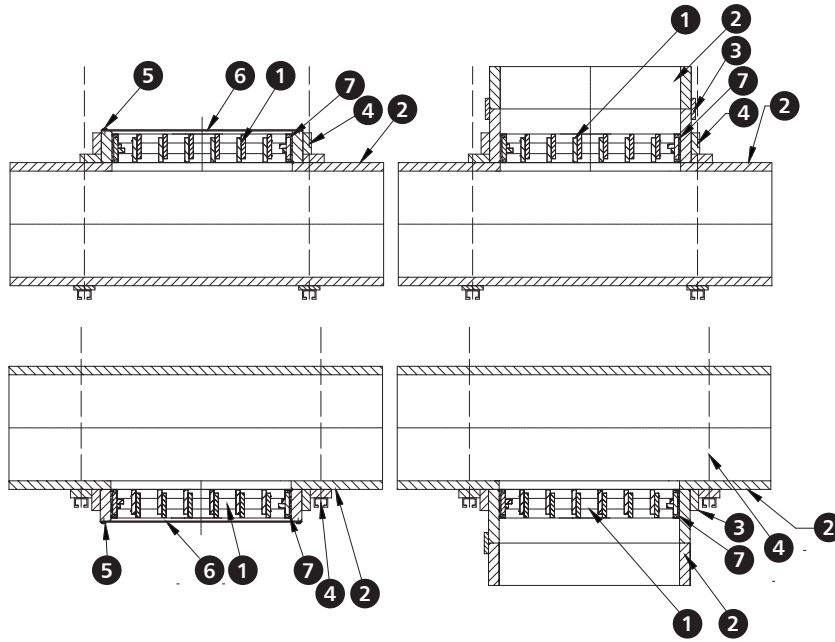
* Recommended damper installation in a wet system is based on masonry mortar on the basis of gypsum or cement. The manufacturer allows for using other materials with parameters that confirm and ensure the appropriate fire resistance rating for the installation method applied.

mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

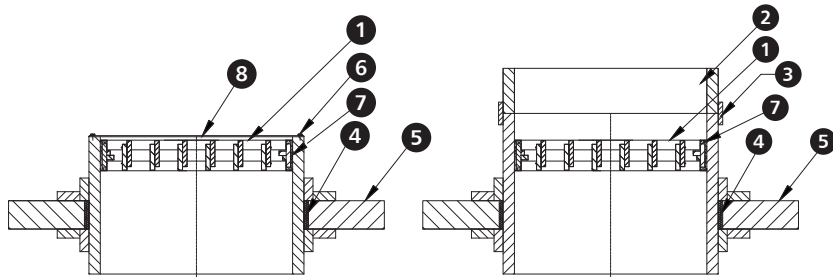
14.5.4 | Sample installation in fire ventilation system ducts



- | | |
|--|---------------------------------|
| 1. mcr WIP PRO/V BxH smoke control damper | 5. M10 x 20 bolt |
| 2. Multi-zone smoke extract duct – e.g. made of fire-proof boards | 6. MWB system grille (optional) |
| 3. A strip of fire-proof board along the entire length of the BxH side | 7. System duct sealing |
| 4. Installation hangers system | |

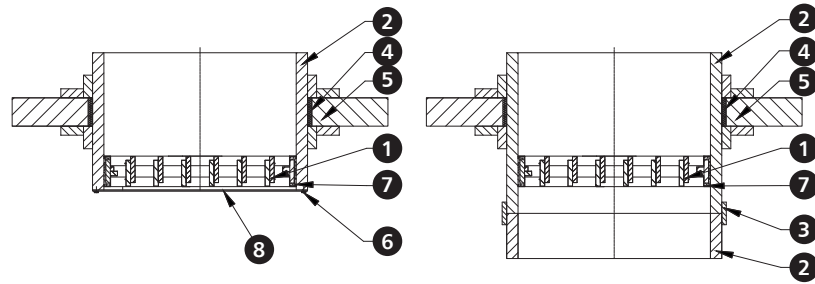


- | | |
|--|---------------------------------|
| 1. mcr WIP PRO/V BxH smoke control damper | 5. M10 x 20 bolt |
| 2. Multi-zone smoke extract duct – e.g. made of fire-proof boards | 6. MWB system grille (optional) |
| 3. A strip of fire-proof board along the entire length of the BxH side | 7. System duct sealing |
| 4. Installation hangers system | |



- | | |
|--|---------------------------------|
| 1. mcr WIP PRO/V BxH smoke control damper | 5. Floor slab |
| 2. Multi-zone smoke extract duct – e.g. made of fire-proof boards | 6. M10 x 20 bolt |
| 3. A strip of fire-proof board along the entire length of the BxH side | 7. System duct sealing |
| 4. Installation hangers system | 8. MWB system grille (optional) |

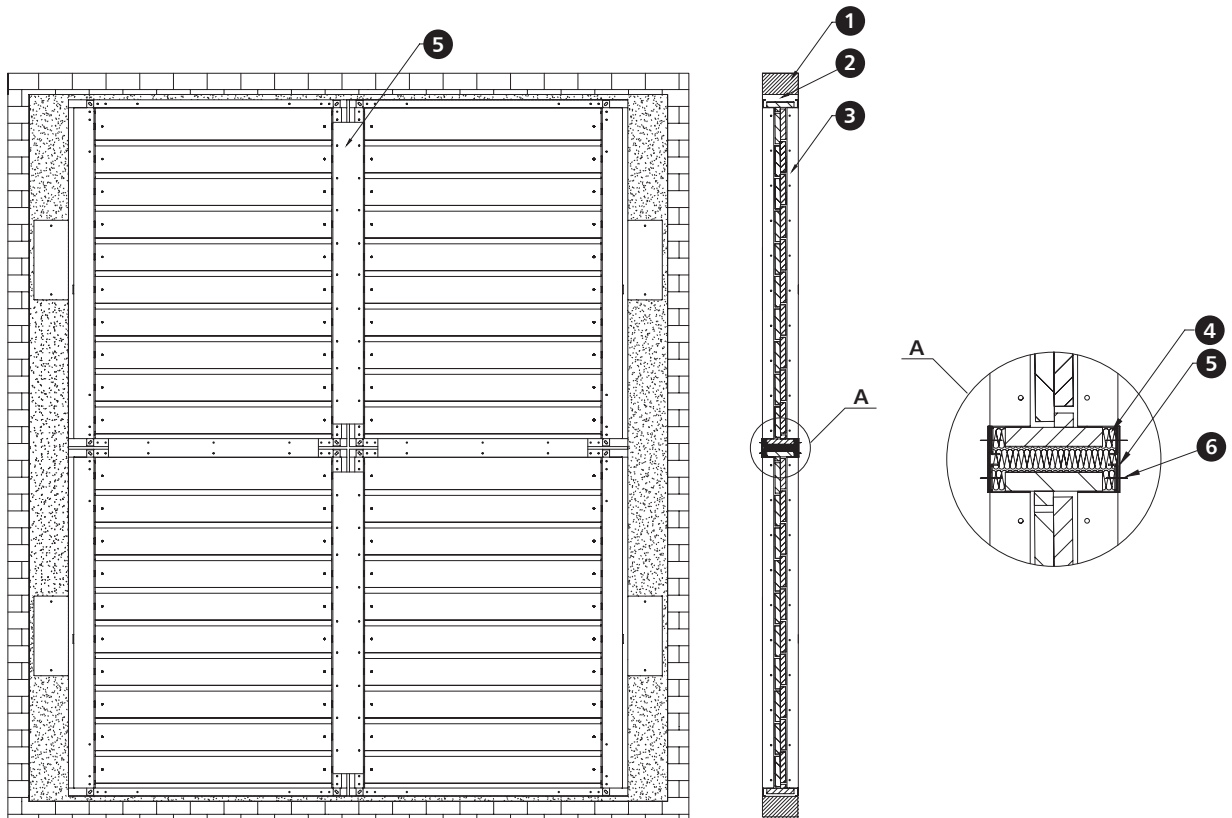
mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems



1. mcr WIP PRO/V BxH smoke control damper
2. Multi-zone smoke extract duct – e.g. made of fire-proof boards
3. A strip of fire-proof board along the entire length of the BxH side
4. Fireproof duct installation penetration system.

5. Floor slab
6. M10 x 20 bolt
7. System duct sealing
8. MWB system grille (optional)

14.5.5 | Sample modular installation



1. e.g. masonry wall
2. e.g. cement mortar*
3. mcr WIP PRO/V damper module

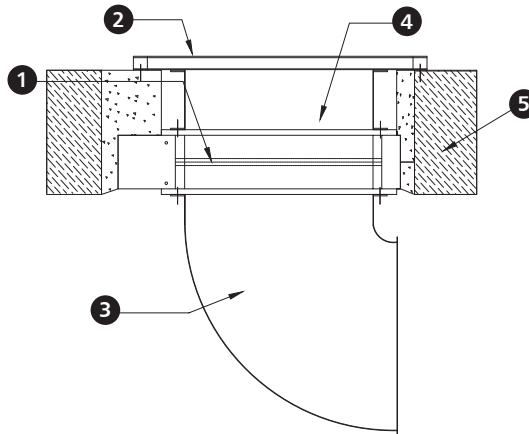
4. mineral wool with a density of at least 80 kg/m³, A1 class
5. steel installation element
6. ST8 x 16 screw

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

Also applicable for versions with LC casing

mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

» Example applications - installation with a masking element



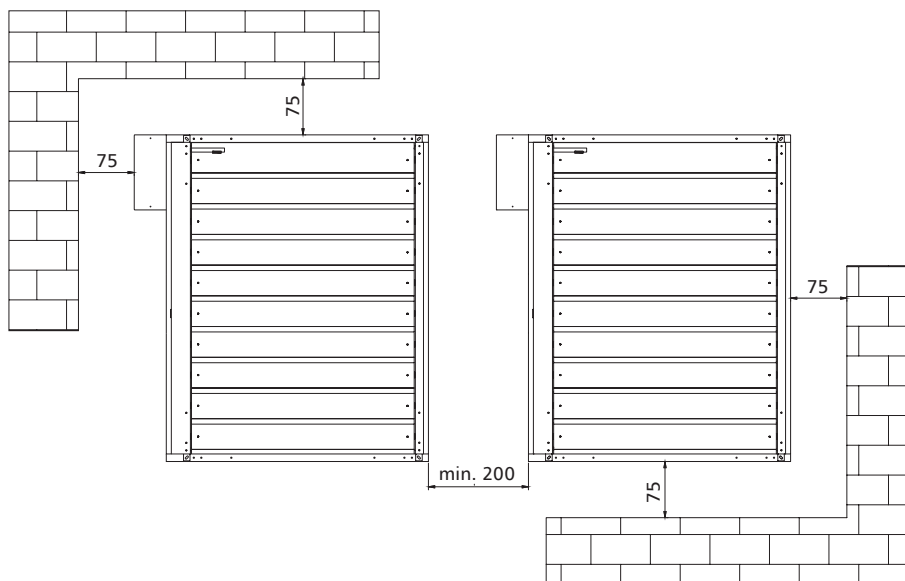
1. mcr WIP PRO/V fire damper
2. masking element
3. smoke ventilation duct
4. duct - ventilation straight connection piece
5. wall, floor slab

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

» Damper installation with a vertical louver rotation axis

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

» Distance between systems and partitions



dimensions in [mm]

mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

14.6 | mcr WIP PRO/V, mcr WIP PRO/V-M rectangular dampers technical parameters

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		270					300					350					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	110	4	0.030	0.019	269	13	33	0.033	0.019	269	14	34	0.039	0.019	269	16	36
		6			404	30	44			404	30	44			404	36	46
		8			539	53	51			539	54	52			539	63	54
		10			673	82	57			673	85	58			673	99	60
	150	4	0.041	0.026	367	13	35	0.045	0.026	367	14	35	0.053	0.026	367	16	37
		6			551	30	45			551	30	46			551	36	48
		8			734	53	53			734	54	53			734	63	55
		10			918	82	59			918	85	59			918	99	61
	200	4	0.054	0.034	490	13	36	0.060	0.034	490	14	36	0.070	0.034	490	16	38
		6			734	30	46			734	30	47			734	36	49
		8			979	53	54			979	54	54			979	63	56
		10			1 224	82	60			1 224	84	60			1 224	99	62
250	4	0.068	0.043	612	13	37	0.075	0.043	612	14	37	0.088	0.043	612	16	39	
	6			918	30	47			918	30	48			918	36	50	
	8			1 224	53	55			1 224	54	55			1 224	63	57	
	10			1 530	82	61			1 530	85	61			1 530	99	63	
300	4	0.081	0.051	734	13	38	0.090	0.051	734	14	38	0.105	0.051	734	16	40	
	6			1 102	30	48			1 102	30	49			1 102	36	51	
	8			1 469	53	56			1 469	54	56			1 469	63	58	
	10			1 836	82	62			1 836	85	62			1 836	99	64	
350	4	0.095	0.060	857	13	38	0.105	0.060	857	14	39	0.123	0.060	857	16	41	
	6			1 285	30	49			1 285	30	49			1 285	36	51	
	8			1 714	53	56			1 714	54	57			1 714	63	59	
	10			2 142	82	62			2 142	85	63			2 142	99	65	
400	4	0.108	0.068	979	13	39	0.120	0.068	979	14	39	0.140	0.068	979	16	41	
	6			1 469	30	49			1 469	30	50			1 469	36	52	
	8			1 958	53	57			1 958	54	57			1 958	63	59	
	10			2 448	82	63			2 448	84	63			2 448	99	65	
450	4	0.122	0.077	1 102	13	39	0.135	0.077	1 102	14	40	0.158	0.077	1 102	16	42	
	6			1 652	30	50			1 652	30	50			1 652	36	52	
	8			2 203	53	57			2 203	54	58			2 203	63	60	
	10			2 754	82	63			2 754	84	64			2 754	99	66	
500	4	0.135	0.085	1 224	13	40	0.150	0.085	1 224	14	40	0.175	0.085	1 224	16	42	
	6			1 836	30	50			1 836	30	51			1 836	36	53	
	8			2 448	53	58			2 448	54	58			2 448	63	60	
	10			3 060	82	64			3 060	85	64			3 060	99	66	
550	4	0.149	0.094	1 346	2	13	0.165	0.094	1 346	14	41	0.193	0.094	1 346	16	43	
	6			2 020	4	24			2 020	30	51			2 020	36	53	
	8			2 693	7	31			2 693	54	59			2 693	63	61	
	10			3 366	10	37			3 366	84	65			3 366	99	67	
600	4	0.162	0.102	1 469	13	41	0.180	0.102	1 469	14	41	0.210	0.102	1 469	16	43	
	6			2 203	30	51			2 203	30	52			2 203	36	54	
	8			2 938	53	59			2 938	54	59			2 938	63	61	
	10			3 672	82	65			3 672	85	65			3 672	99	67	
650	4	0.176	0.111	1 591	13	41	0.195	0.111	1 591	14	41	0.228	0.111	1 591	16	43	
	6			2 387	30	52			2 387	30	52			2 387	36	54	
	8			3 182	53	59			3 182	54	59			3 182	63	62	
	10			3 978	82	65			3 978	85	65			3 978	99	67	

mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		270					300					350					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	700	4	0.189	0.119	1 714	13	41	0.210	0.119	1 714	14	42	0.245	0.119	1 714	16	44
		6			2 570	30	52			2 570	30	52			2 570	36	54
		8			3 427	53	59			3 427	54	60			3 427	63	62
		10			4 284	82	65			4 284	85	66			4 284	99	68
	750	4	0.203	0.128	1 836	13	42	0.225	0.128	1 836	14	42	0.263	0.128	1 836	16	44
		6			2 754	30	52			2 754	30	53			2 754	36	55
		8			3 672	53	60			3 672	54	60			3 672	63	62
		10			4 590	82	66			4 590	85	66			4 590	99	68
	800	4	0.216	0.136	1 958	13	42	0.240	0.136	1 958	14	42	0.280	0.136	1 958	16	44
		6			2 938	30	52			2 938	30	53			2 938	36	55
		8			3 917	53	60			3 917	54	60			3 917	63	62
		10			4 896	82	66			4 896	84	66			4 896	99	68
	850	4	0.230	0.145	2 081	13	42	0.255	0.145	2 081	14	43	0.298	0.145	2 081	16	45
		6			3 121	30	53			3 121	30	53			3 121	36	55
		8			4 162	53	60			4 162	54	61			4 162	63	63
		10			5 202	82	66			5 202	84	66			5 202	99	68
	900	4	0.243	0.153	2 203	13	42	0.270	0.153	2 203	14	43	0.315	0.153	2 203	16	45
		6			3 305	30	53			3 305	30	53			3 305	36	55
		8			4 406	53	60			4 406	54	61			4 406	63	63
		10			5 508	82	66			5 508	84	67			5 508	99	69
	950	4	0.257	0.162	2 326	13	43	0.285	0.162	2 326	18	47	0.333	0.162	2 326	25	51
		6			3 488	30	53			3 488	41	57			3 488	57	62
		8			4 651	53	61			4 651	72	65			4 651	102	69
		10			5 814	82	67			5 814	113	71			5 814	159	75
	1000	4	0.270	0.170	2 448	13	43	0.300	0.170	2 448	18	47	0.350	0.170	2 448	25	51
		6			3 672	30	53			3 672	41	58			3 672	57	62
		8			4 896	53	61			4 896	72	65			4 896	102	70
		10			6 120	82	67			6 120	113	71			6 120	159	75
	1050	4	0.284	0.179	2 570	13	43	0.315	0.179	2 570	18	47	0.368	0.179	2 570	25	52
		6			3 856	30	54			3 856	41	58			3 856	57	62
		8			5 141	53	61			5 141	72	65			5 141	102	70
		10			6 426	82	67			6 426	113	71			6 426	159	76
	1100	4	0.297	0.187	2 693	13	43	0.330	0.187	2 693	18	47	0.385	0.187	2 693	25	52
		6			4 039	30	54			4 039	41	58			4 039	57	62
		8			5 386	53	61			5 386	72	65			5 386	102	70
		10			6 732	82	67			6 732	113	71			6 732	159	76
	1150	4	0.311	0.196	2 815	13	43	0.345	0.196	2 815	18	48	0.403	0.196	2 815	25	52
		6			4 223	30	54			4 223	41	58			4 223	57	63
		8			5 630	53	62			5 630	72	66			5 630	102	70
		10			7 038	82	67			7 038	113	71			7 038	159	76
1200	4	0.324	0.204	2 938	13	44	0.360	0.204	2 938	18	48	0.420	0.204	2 938	25	52	
	6			4 406	30	54			4 406	41	58			4 406	57	63	
	8			5 875	53	62			5 875	72	66			5 875	102	70	
	10			7 344	82	68			7 344	113	72			7 344	159	76	
1250	4	0.338	0.213	3 060	13	44	0.375	0.213	3 060	18	48	0.438	0.213	3 060	25	52	
	6			4 590	30	54			4 590	41	59			4 590	57	63	
	8			6 120	53	62			6 120	72	66			6 120	102	70	
	10			7 650	82	68			7 650	113	72			7 650	159	76	

mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		390					450					520					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	110	4	0.043	0.028	401	12	34	0.050	0.028	401	14	36	0.057	0.037	532	12	35
		6			601	27	44			601	31	46			798	27	46
		8			802	47	52			802	55	54			1 064	48	53
		10			1 002	74	58			1 002	86	60			1 331	75	59
	150	4	0.059	0.038	546	12	35	0.068	0.038	546	14	37	0.078	0.050	726	12	36
		6			820	27	46			820	31	48			1 089	27	47
		8			1 093	47	53			1 093	55	55			1 452	48	54
		10			1 366	74	59			1 366	86	61			1 814	75	60
	200	4	0.078	0.051	729	12	36	0.090	0.051	729	14	38	0.104	0.067	968	12	38
		6			1 093	27	47			1 093	31	49			1 452	27	48
		8			1 457	47	54			1 457	55	56			1 935	48	56
		10			1 822	74	60			1 822	86	62			2 419	75	62
250	4	0.098	0.063	911	12	37	0.113	0.063	911	14	39	0.130	0.084	1 210	12	39	
	6			1 366	27	48			1 366	31	50			1 814	27	49	
	8			1 822	47	55			1 822	55	57			2 419	48	57	
	10			2 277	74	61			2 277	86	63			3 024	75	63	
300	4	0.117	0.076	1 093	12	38	0.135	0.076	1 093	14	40	0.156	0.101	1 452	12	39	
	6			1 639	27	49			1 639	31	51			2 177	27	50	
	8			2 186	47	56			2 186	55	58			2 903	48	57	
	10			2 732	74	62			2 732	86	64			3 629	75	63	
350	4	0.137	0.089	1 275	12	39	0.158	0.089	1 275	14	41	0.182	0.118	1 693	12	40	
	6			1 913	27	49			1 913	31	51			2 540	27	51	
	8			2 550	47	57			2 550	55	59			3 387	48	58	
	10			3 188	74	63			3 188	86	65			4 234	75	64	
400	4	0.156	0.101	1 457	12	39	0.180	0.101	1 457	14	41	0.208	0.134	1 935	12	41	
	6			2 186	27	50			2 186	31	52			2 903	27	51	
	8			2 915	47	57			2 915	55	59			3 871	48	59	
	10			3 643	74	63			3 643	86	65			4 838	75	65	
450	4	0.176	0.114	1 639	12	40	0.203	0.114	1 639	14	42	0.234	0.151	2 177	12	41	
	6			2 459	27	50			2 459	31	52			3 266	27	52	
	8			3 279	47	58			3 279	55	60			4 355	48	59	
	10			4 099	74	64			4 099	86	66			5 443	75	65	
500	4	0.195	0.127	1 822	12	40	0.225	0.127	1 822	14	42	0.260	0.168	2 419	12	42	
	6			2 732	27	51			2 732	31	53			3 629	27	52	
	8			3 643	47	58			3 643	55	60			4 838	48	60	
	10			4 554	74	64			4 554	86	66			6 048	75	66	
550	4	0.215	0.139	2 004	12	41	0.248	0.139	2 004	14	43	0.286	0.185	2 661	12	42	
	6			3 006	27	51			3 006	31	53			3 992	27	53	
	8			4 008	47	59			4 008	55	61			5 322	48	60	
	10			5 009	74	65			5 009	86	67			6 653	75	66	
600	4	0.234	0.152	2 186	12	41	0.270	0.152	2 186	14	43	0.312	0.202	2 903	12	42	
	6			3 279	27	52			3 279	31	54			4 355	27	53	
	8			4 372	47	59			4 372	55	61			5 806	48	61	
	10			5 465	74	65			5 465	86	67			7 258	75	66	
650	4	0.254	0.164	2 368	12	41	0.293	0.164	2 368	14	43	0.338	0.218	3 145	12	43	
	6			3 552	27	52			3 552	31	54			4 717	27	53	
	8			4 736	47	59			4 736	55	61			6 290	48	61	
	10			5 920	74	65			5 920	86	67			7 862	75	67	

mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		390					450					520					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	700	4	0.273	0.177	2 550	12	42	0.315	0.177	2 550	14	44	0.364	0.235	3 387	12	43
		6			3 825	27	52			3 825	31	54			5 080	27	54
		8			5 100	47	60			5 100	55	62			6 774	48	61
		10			6 376	74	66			6 376	86	68			8 467	75	67
	750	4	0.293	0.190	2 732	12	42	0.338	0.190	2 732	14	44	0.390	0.252	3 629	12	43
		6			4 099	27	53			4 099	31	55			5 443	27	54
		8			5 465	47	60			5 465	55	62			7 258	48	61
		10			6 831	74	66			6 831	86	68			9 072	75	67
	800	4	0.312	0.202	2 915	12	42	0.360	0.202	2 915	14	43	0.416	0.269	3 871	12	43
		6			4 372	27	53			4 372	31	54			5 806	27	54
		8			5 829	47	60			5 829	55	61			7 741	48	61
		10			7 286	74	66			7 286	86	67			9 677	75	67
850	4	0.332	0.215	3 097	12	43	0.383	0.215	3 097	14	43	0.442	0.286	4 113	12	43	
	6			4 645	27	53			4 645	31	54			6 169	27	54	
	8			6 193	47	61			6 193	55	61			8 225	48	61	
	10			7 742	74	66			7 742	86	67			10 282	75	67	
900	4	0.351	0.228	3 279	12	43	0.405	0.228	3 279	14	43	0.468	0.302	4 355	12	43	
	6			4 918	27	53			4 918	31	54			6 532	27	54	
	8			6 558	47	61			6 558	55	61			8 709	48	61	
	10			8 197	74	67			8 197	86	67			10 886	75	67	
950	4	0.371	0.240	3 461	12	43	0.428	0.240	3 461	18	49	0.494	0.319	4 596	12	44	
	6			5 192	27	54			5 192	41	59			6 895	27	55	
	8			6 922	47	61			6 922	74	67			9 193	48	62	
	10			8 653	74	67			8 653	115	73			11 491	75	68	
1000	4	0.390	0.253	3 643	12	43	0.450	0.253	3 643	18	49	0.520	0.336	4 838	12	45	
	6			5 465	27	54			5 465	41	60			7 258	27	55	
	8			7 286	47	61			7 286	74	67			9 677	48	63	
	10			9 108	74	67			9 108	115	73			12 096	75	69	
1050	4	0.410	0.266	3 825	12	43	0.473	0.266	3 825	18	49	0.546	0.353	5 080	12	45	
	6			5 738	27	54			5 738	41	60			7 620	27	55	
	8			7 651	47	62			7 651	74	67			10 161	48	63	
	10			9 563	74	67			9 563	115	73			12 701	75	69	
1100	4	0.429	0.278	4 008	12	44	0.495	0.278	4 008	18	49	0.572	0.370	5 322	12	45	
	6			6 011	27	54			6 011	41	60			7 983	27	56	
	8			8 015	47	62			8 015	74	67			10 644	48	63	
	10			10 019	74	68			10 019	115	73			13 306	75	69	
1150	4	0.449	0.291	4 190	12	44	0.518	0.291	4 190	18	50	0.598	0.386	5 564	12	45	
	6			6 285	27	54			6 285	41	60			8 346	27	56	
	8			8 379	47	62			8 379	74	68			11 128	48	63	
	10			10 474	74	68			10 474	115	73			13 910	75	69	
1200	4	0.468	0.304	4 372	12	44	0.540	0.304	4 372	18	50	0.624	0.403	5 806	12	45	
	6			6 558	27	55			6 558	41	60			8 709	27	56	
	8			8 744	47	62			8 744	74	68			11 612	48	64	
	10			10 930	74	68			10 930	115	74			14 515	75	69	
1250	4	0.488	0.316	4 554	12	44	0.563	0.316	4 554	18	50	0.650	0.420	6 048	12	46	
	6			6 831	27	55			6 831	41	61			9 072	27	56	
	8			9 108	47	62			9 108	74	68			12 096	48	64	
	10			11 385	74	68			11 385	115	74			15 120	75	70	

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S_e – damper active cross-section [m²]

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

		height H [mm]															
		550					640					650					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	110	4	0.061	0.037	532	13	36	0.070	0.046	664	11	35	0.072	0.046	664	12	36
		6			798	29	46			996	26	46			996	27	47
		8			1 064	51	54			1 327	46	53			1 327	48	54
		10			1 331	79	60			1 659	72	59			1 659	76	60
	150	4	0.083	0.050	726	13	37	0.096	0.063	905	11	37	0.098	0.063	905	12	37
		6			1 089	29	48			1 358	26	47			1 358	27	48
		8			1 452	51	55			1 810	46	55			1 810	48	56
		10			1 814	79	61			2 263	72	61			2 263	76	61
	200	4	0.110	0.067	968	13	38	0.128	0.084	1 207	11	38	0.130	0.084	1 207	12	39
		6			1 452	29	49			1 810	26	49			1 810	27	49
		8			1 935	51	56			2 413	46	56			2 413	48	57
		10			2 419	79	62			3 017	72	62			3 017	76	63
250	4	0.138	0.084	1 210	13	39	0.160	0.105	1 508	11	39	0.163	0.105	1 508	12	40	
	6			1 814	29	50			2 263	26	50			2 263	27	50	
	8			2 419	51	57			3 017	46	57			3 017	48	58	
	10			3 024	79	63			3 771	72	63			3 771	76	64	
300	4	0.165	0.101	1 452	13	40	0.192	0.126	1 810	11	40	0.195	0.126	1 810	12	41	
	6			2 177	29	51			2 715	26	50			2 715	27	51	
	8			2 903	51	58			3 620	46	58			3 620	48	59	
	10			3 629	79	64			4 525	72	64			4 525	76	64	
350	4	0.193	0.118	1 693	13	41	0.224	0.147	2 112	11	40	0.228	0.147	2 112	12	41	
	6			2 540	29	51			3 168	26	51			3 168	27	52	
	8			3 387	51	59			4 224	46	58			4 224	48	59	
	10			4 234	79	65			5 279	72	64			5 279	76	65	
400	4	0.220	0.134	1 935	13	41	0.256	0.168	2 413	11	41	0.260	0.168	2 413	12	42	
	6			2 903	29	52			3 620	26	52			3 620	27	52	
	8			3 871	51	59			4 827	46	59			4 827	48	60	
	10			4 838	79	65			6 034	72	65			6 034	76	66	
450	4	0.248	0.151	2 177	13	42	0.288	0.189	2 715	11	42	0.293	0.189	2 715	12	42	
	6			3 266	29	52			4 073	26	52			4 073	27	53	
	8			4 355	51	60			5 430	46	60			5 430	48	60	
	10			5 443	79	66			6 788	72	65			6 788	76	66	
500	4	0.275	0.168	2 419	13	42	0.320	0.210	3 017	11	42	0.325	0.210	3 017	12	43	
	6			3 629	29	53			4 525	26	53			4 525	27	53	
	8			4 838	51	60			6 034	46	60			6 034	48	61	
	10			6 048	79	66			7 542	72	66			7 542	76	67	
550	4	0.303	0.185	2 661	13	43	0.352	0.230	3 318	11	42	0.358	0.230	3 318	12	43	
	6			3 992	29	53			4 978	26	53			4 978	27	54	
	8			5 322	51	61			6 637	46	60			6 637	48	61	
	10			6 653	79	67			8 296	72	66			8 296	76	67	
600	4	0.330	0.202	2 903	13	43	0.384	0.251	3 620	11	43	0.390	0.251	3 620	12	44	
	6			4 355	29	54			5 430	26	53			5 430	27	54	
	8			5 806	51	61			7 240	46	61			7 240	48	62	
	10			7 258	79	67			9 050	72	67			9 050	76	67	
650	4	0.358	0.218	3 145	13	44	0.416	0.272	3 922	11	43	0.423	0.272	3 922	12	44	
	6			4 717	29	54			5 883	26	54			5 883	27	54	
	8			6 290	51	62			7 844	46	61			7 844	48	62	
	10			7 862	79	67			9 805	72	67			9 805	76	68	

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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		550					640					650					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	700	4	0.385	0.235	3 387	13	44	0.448	0.293	4 224	11	43	0.455	0.293	4 224	12	44
		6			5 080	29	54			6 335	26	54			6 335	27	55
		8			6 774	51	62			8 447	46	61			8 447	48	62
		10			8 467	79	68			10 559	72	67			10 559	76	68
	750	4	0.413	0.252	3 629	13	44	0.480	0.314	4 525	11	44	0.488	0.314	4 525	12	44
		6			5 443	29	55			6 788	26	54			6 788	27	55
		8			7 258	51	62			9 050	46	62			9 050	48	63
		10			9 072	79	68			11 313	72	68			11 313	76	68
	800	4	0.440	0.269	3 871	13	44	0.512	0.335	4 827	11	44	0.520	0.335	4 827	12	44
		6			5 806	29	55			7 240	26	55			7 240	27	55
		8			7 741	51	62			9 654	46	62			9 654	48	63
		10			9 677	79	68			12 067	72	68			12 067	76	68
850	4	0.468	0.286	4 113	13	45	0.544	0.356	5 129	11	44	0.553	0.356	5 129	12	44	
	6			6 169	29	55			7 693	26	55			7 693	27	55	
	8			8 225	51	63			10 257	46	62			10 257	48	63	
	10			10 282	79	69			12 821	72	68			12 821	76	68	
900	4	0.495	0.302	4 355	13	45	0.576	0.377	5 430	11	45	0.585	0.377	5 430	12	44	
	6			6 532	29	56			8 145	26	52			8 145	27	55	
	8			8 709	51	63			10 860	46	60			10 860	48	63	
	10			10 886	79	69			13 576	72	65			13 576	76	68	
950	4	0.523	0.319	4 596	15	47	0.608	0.398	5 732	11	45	0.618	0.398	5 732	12	46	
	6			6 895	33	57			8 598	26	55			8 598	27	56	
	8			9 193	58	65			11 464	46	63			11 464	48	64	
	10			11 491	91	71			14 330	72	69			14 330	76	69	
1000	4	0.550	0.336	4 838	15	47	0.640	0.419	6 034	11	45	0.650	0.419	6 034	12	46	
	6			7 258	33	58			9 050	26	56			9 050	27	56	
	8			9 677	58	65			12 067	46	63			12 067	48	64	
	10			12 096	91	71			15 084	72	69			15 084	76	70	
1050	4	0.578	0.353	5 080	15	47	0.672	0.440	6 335	11	45	0.683	0.440	6 335	12	46	
	6			7 620	33	58			9 503	26	56			9 503	27	57	
	8			10 161	58	65			12 671	46	63			12 671	48	64	
	10			12 701	91	71			15 838	72	69			15 838	76	70	
1100	4	0.605	0.370	5 322	15	48	0.704	0.461	6 637	11	45	0.715	0.461	6 637	12	46	
	6			7 983	33	58			9 955	26	56			9 955	27	57	
	8			10 644	58	66			13 274	46	63			13 274	48	64	
	10			13 306	91	71			16 592	72	69			16 592	76	70	
1150	4	0.633	0.386	5 564	15	48	0.736	0.482	6 939	11	46	0.748	0.482	6 939	12	46	
	6			8 346	33	58			10 408	26	56			10 408	27	57	
	8			11 128	58	66			13 877	46	64			13 877	48	64	
	10			13 910	91	72			17 347	72	69			17 347	76	70	
1200	4	0.660	0.403	5 806	15	48	0.768	0.503	7 240	11	46	0.780	0.503	7 240	12	47	
	6			8 709	33	58			10 860	26	56			10 860	27	57	
	8			11 612	58	66			14 481	46	64			14 481	48	65	
	10			14 515	91	72			18 101	72	70			18 101	76	70	
1250	4	0.688	0.420	6 048	15	48	0.800	0.524	7 542	11	46	0.813	0.524	7 542	12	47	
	6			9 072	33	59			11 313	26	57			11 313	27	57	
	8			12 096	58	66			15 084	46	64			15 084	48	65	
	10			15 120	91	72			18 855	72	70			18 855	76	71	

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		height H [mm]															
		700					760					800					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	110	4	0.077	0.046	664	14	38	0.084	0.055	795	12	37	0.088	0.055	795	10	34
		6			996	30	48			1 193	28	48			1 193	22	45
		8			1 327	54	56			1 590	50	55			1 590	40	52
		10			1 659	85	61			1 988	78	61			1 988	62	58
	150	4	0.105	0.063	905	14	39	0.114	0.075	1 084	12	39	0.120	0.075	1 084	10	36
		6			1 358	30	49			1 626	28	49			1 626	22	46
		8			1 810	54	57			2 169	50	57			2 169	40	54
		10			2 263	85	63			2 711	78	62			2 711	62	60
	200	4	0.140	0.084	1 207	14	40	0.152	0.100	1 446	12	40	0.160	0.100	1 446	10	37
		6			1 810	30	51			2 169	28	50			2 169	22	48
		8			2 413	54	58			2 892	50	58			2 892	40	55
		10			3 017	85	64			3 614	78	64			3 614	62	61
250	4	0.175	0.105	1 508	14	41	0.190	0.126	1 807	12	41	0.200	0.126	1 807	10	38	
	6			2 263	30	52			2 711	28	51			2 711	22	49	
	8			3 017	54	59			3 614	50	59			3 614	40	56	
	10			3 771	85	65			4 518	78	65			4 518	62	62	
300	4	0.210	0.126	1 810	14	42	0.228	0.151	2 169	12	42	0.240	0.151	2 169	10	39	
	6			2 715	30	53			3 253	28	52			3 253	22	49	
	8			3 620	54	60			4 337	50	60			4 337	40	57	
	10			4 525	85	66			5 422	78	66			5 422	62	63	
350	4	0.245	0.147	2 112	14	43	0.266	0.176	2 530	12	42	0.280	0.176	2 530	10	39	
	6			3 168	30	53			3 795	28	53			3 795	22	50	
	8			4 224	54	61			5 060	50	60			5 060	40	57	
	10			5 279	85	66			6 325	78	66			6 325	62	63	
400	4	0.280	0.168	2 413	14	43	0.304	0.201	2 892	12	43	0.320	0.201	2 892	10	40	
	6			3 620	30	54			4 337	28	53			4 337	22	51	
	8			4 827	54	61			5 783	50	61			5 783	40	58	
	10			6 034	85	67			7 229	78	67			7 229	62	64	
450	4	0.315	0.189	2 715	14	44	0.342	0.226	3 253	12	43	0.360	0.226	3 253	10	41	
	6			4 073	30	54			4 879	28	54			4 879	22	51	
	8			5 430	54	62			6 506	50	61			6 506	40	59	
	10			6 788	85	68			8 132	78	67			8 132	62	64	
500	4	0.350	0.210	3 017	14	44	0.380	0.251	3 614	12	44	0.400	0.251	3 614	10	41	
	6			4 525	30	55			5 422	28	54			5 422	22	52	
	8			6 034	54	62			7 229	50	62			7 229	40	59	
	10			7 542	85	68			9 036	78	68			9 036	62	65	
550	4	0.385	0.230	3 318	14	45	0.418	0.276	3 976	12	44	0.440	0.276	3 976	10	41	
	6			4 978	30	55			5 964	28	55			5 964	22	52	
	8			6 637	54	63			7 952	50	62			7 952	40	59	
	10			8 296	85	68			9 940	78	68			9 940	62	65	
600	4	0.420	0.251	3 620	14	45	0.456	0.301	4 337	12	45	0.480	0.301	4 337	10	42	
	6			5 430	30	56			6 506	28	55			6 506	22	52	
	8			7 240	54	63			8 675	50	63			8 675	40	60	
	10			9 050	85	69			10 843	78	69			10 843	62	66	
650	4	0.455	0.272	3 922	14	45	0.494	0.326	4 699	12	45	0.520	0.326	4 699	10	42	
	6			5 883	30	56			7 048	28	56			7 048	22	53	
	8			7 844	54	63			9 397	50	63			9 397	40	60	
	10			9 805	85	69			11 747	78	69			11 747	62	66	

mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		700					760					800					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	700	4	0.490	0.293	4 224	14	46	0.532	0.351	5 060	12	45	0.560	0.351	5 060	10	42
		6			6 335	30	56			7 590	28	56			7 590	22	53
		8			8 447	54	64			10 120	50	63			10 120	40	61
		10			10 559	85	69			12 650	78	69			12 650	62	66
	750	4	0.525	0.314	4 525	14	46	0.570	0.377	5 422	12	46	0.600	0.377	5 422	10	43
		6			6 788	30	56			8 132	28	56			8 132	22	53
		8			9 050	54	64			10 843	50	64			10 843	40	61
		10			11 313	85	70			13 554	78	69			13 554	62	67
	800	4	0.560	0.335	4 827	14	44	0.608	0.402	5 783	12	46	0.640	0.402	5 783	10	43
		6			7 240	30	55			8 675	28	56			8 675	22	54
		8			9 654	54	62			11 566	50	64			11 566	40	61
		10			12 067	85	67			14 458	78	70			14 458	62	67
	850	4	0.595	0.356	5 129	14	46	0.646	0.427	6 144	12	46	0.680	0.427	6 144	10	43
		6			7 693	30	57			9 217	28	57			9 217	22	54
		8			10 257	54	65			12 289	50	64			12 289	40	61
		10			12 821	85	70			15 361	78	70			15 361	62	67
	900	4	0.630	0.377	5 430	14	47	0.684	0.452	6 506	12	46	0.720	0.452	6 506	10	44
		6			8 145	30	57			9 759	28	57			9 759	22	54
		8			10 860	54	65			13 012	50	64			13 012	40	62
		10			13 576	85	71			16 265	78	70			16 265	62	67
	950	4	0.665	0.398	5 732	15	49	0.722	0.477	6 867	11	45	0.760	0.477	6 867	13	48
		6			8 598	35	59			10 301	25	56			10 301	30	58
		8			11 464	62	67			13 735	44	63			13 735	53	66
		10			14 330	97	73			17 168	69	69			17 168	83	71
	1000	4	0.700	0.419	6 034	15	49	0.760	0.502	7 229	11	45	0.800	0.502	7 229	13	48
		6			9 050	35	59			10 843	25	56			10 843	30	58
		8			12 067	62	67			14 458	44	63			14 458	53	66
		10			15 084	97	73			18 072	69	69			18 072	83	72
	1050	4	0.735	0.440	6 335	15	49	0.798	0.527	7 590	11	46	0.840	0.527	7 590	13	48
		6			9 503	35	60			11 385	25	56			11 385	30	59
		8			12 671	62	67			15 180	44	64			15 180	53	66
		10			15 838	97	73			18 976	69	69			18 976	83	72
	1100	4	0.770	0.461	6 637	15	49	0.836	0.552	7 952	11	46	0.880	0.552	7 952	13	48
		6			9 955	35	60			11 928	25	56			11 928	30	59
		8			13 274	62	67			15 903	44	64			15 903	53	66
		10			16 592	97	73			19 879	69	70			19 879	83	72
	1150	4	0.805	0.482	6 939	15	50	0.874	0.577	8 313	11	46	0.920	0.577	8 313	13	48
		6			10 408	35	60			12 470	25	56			12 470	30	59
		8			13 877	62	68			16 626	44	64			16 626	53	66
		10			17 347	97	73			20 783	69	70			20 783	83	72
1200	4	0.840	0.503	7 240	15	50	0.912	0.602	8 675	11	46	0.960	0.602	8 675	13	49	
	6			10 860	35	60			13 012	25	57			13 012	30	59	
	8			14 481	62	68			17 349	44	64			17 349	53	67	
	10			18 101	97	74			21 686	69	70			21 686	83	72	
1250	4	0.875	0.524	7 542	15	50	0.950	0.628	9 036	11	46	1.000	0.628	9 036	13	49	
	6			11 313	35	60			13 554	25	57			13 554	30	59	
	8			15 084	62	68			18 072	44	64			18 072	53	67	
	10			18 855	97	74			22 590	69	70			22 590	83	73	

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S_e – damper active cross-section [m²]

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

		height H [mm]															
		890					900					950					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	110	4	0.098	0.064	927	13	38	0.099	0.064	927	13	39	0.105	0.064	927	14	40
		6			1 390	29	49			1 390	30	49			1 390	32	50
		8			1 853	51	56			1 853	53	57			1 853	57	58
		10			2 317	79	62			2 317	83	63			2 317	89	64
	150	4	0.134	0.088	1 264	13	40	0.135	0.088	1 264	13	40	0.143	0.088	1 264	14	41
		6			1 895	29	50			1 895	30	51			1 895	32	52
		8			2 527	51	58			2 527	53	58			2 527	57	59
		10			3 159	79	63			3 159	83	64			3 159	89	65
	200	4	0.178	0.117	1 685	13	41	0.180	0.117	1 685	13	41	0.190	0.117	1 685	14	42
		6			2 527	29	51			2 527	30	52			2 527	32	53
		8			3 370	51	59			3 370	53	59			3 370	57	60
		10			4 212	79	65			4 212	83	65			4 212	89	66
250	4	0.223	0.146	2 106	13	42	0.225	0.146	2 106	13	42	0.238	0.146	2 106	14	43	
	6			3 159	29	52			3 159	30	53			3 159	32	54	
	8			4 212	51	60			4 212	53	60			4 212	57	61	
	10			5 265	79	66			5 265	83	66			5 265	89	67	
300	4	0.267	0.176	2 527	13	43	0.270	0.176	2 527	13	43	0.285	0.176	2 527	14	44	
	6			3 791	29	53			3 791	30	54			3 791	32	55	
	8			5 054	51	61			5 054	53	61			5 054	57	62	
	10			6 318	79	66			6 318	83	67			6 318	89	68	
350	4	0.312	0.205	2 948	13	43	0.315	0.205	2 948	13	44	0.333	0.205	2 948	14	45	
	6			4 423	29	54			4 423	30	54			4 423	32	55	
	8			5 897	51	61			5 897	53	62			5 897	57	63	
	10			7 371	79	67			7 371	83	68			7 371	89	69	
400	4	0.356	0.234	3 370	13	44	0.360	0.234	3 370	13	44	0.380	0.234	3 370	14	45	
	6			5 054	29	54			5 054	30	55			5 054	32	56	
	8			6 739	51	62			6 739	53	62			6 739	57	63	
	10			8 424	79	68			8 424	83	68			8 424	89	69	
450	4	0.401	0.263	3 791	13	44	0.405	0.263	3 791	13	45	0.428	0.263	3 791	14	46	
	6			5 686	29	55			5 686	30	55			5 686	32	56	
	8			7 582	51	62			7 582	53	63			7 582	57	64	
	10			9 477	79	68			9 477	83	69			9 477	89	70	
500	4	0.445	0.293	4 212	13	45	0.450	0.293	4 212	13	45	0.475	0.293	4 212	14	46	
	6			6 318	29	55			6 318	30	56			6 318	32	57	
	8			8 424	51	63			8 424	53	63			8 424	57	64	
	10			10 530	79	69			10 530	83	69			10 530	89	70	
550	4	0.490	0.322	4 633	13	45	0.495	0.322	4 633	13	46	0.523	0.322	4 633	14	47	
	6			6 950	29	56			6 950	30	56			6 950	32	57	
	8			9 266	51	63			9 266	53	64			9 266	57	65	
	10			11 583	79	69			11 583	83	70			11 583	89	70	
600	4	0.534	0.351	5 054	13	46	0.540	0.351	5 054	13	46	0.570	0.351	5 054	14	47	
	6			7 582	29	56			7 582	30	57			7 582	32	58	
	8			10 109	51	64			10 109	53	64			10 109	57	65	
	10			12 636	79	69			12 636	83	70			12 636	89	71	
650	4	0.579	0.380	5 476	13	46	0.585	0.380	5 476	13	46	0.618	0.380	5 476	14	47	
	6			8 213	29	56			8 213	30	57			8 213	32	58	
	8			10 951	51	64			10 951	53	65			10 951	57	65	
	10			13 689	79	70			13 689	83	70			13 689	89	71	

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d_p – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		890					900					950					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	700	4			5 897	13	46			5 897	13	47			5 897	14	48
		6	0.623	0.410	8 845	29	57	0.630	0.410	8 845	30	57	0.665	0.410	8 845	32	58
		8			11 794	51	64			11 794	53	65			11 794	57	66
		10			14 742	79	70			14 742	83	71			14 742	89	72
	750	4			6 318	13	47			6 318	13	47			6 318	14	48
		6	0.668	0.439	9 477	29	57	0.675	0.439	9 477	30	58	0.713	0.439	9 477	32	59
		8			12 636	51	65			12 636	53	65			12 636	57	66
		10			15 795	79	70			15 795	83	71			15 795	89	72
	800	4			6 739	13	47			6 739	13	47			6 739	14	48
		6	0.712	0.468	10 109	29	57	0.720	0.468	10 109	30	58	0.760	0.468	10 109	32	59
		8			13 478	51	65			13 478	53	65			13 478	57	66
		10			16 848	79	71			16 848	83	71			16 848	89	72
850	4			7 160	13	47			7 160	13	48			7 160	14	49	
	6	0.757	0.497	10 741	29	58	0.765	0.497	10 741	30	58	0.808	0.497	10 741	32	59	
	8			14 321	51	65			14 321	53	66			14 321	57	67	
	10			17 901	79	71			17 901	83	71			17 901	89	72	
900	4			7 582	13	47			7 582	13	48			7 582	14	49	
	6	0.801	0.527	11 372	29	58	0.810	0.527	11 372	30	58	0.855	0.527	11 372	32	59	
	8			15 163	51	65			15 163	53	66			15 163	57	67	
	10			18 954	79	71			18 954	83	72			18 954	89	73	
950	4			8 003	11	46			8 003	12	47			8 003	14	49	
	6	0.846	0.556	12 004	25	57	0.855	0.556	12 004	26	57	0.903	0.556	12 004	32	60	
	8			16 006	45	64			16 006	47	65			16 006	57	67	
	10			20 007	70	70			20 007	74	70			20 007	89	73	
1000	4			8 424	11	46			8 424	12	47			8 424	14	49	
	6	0.890	0.585	12 636	25	57	0.900	0.585	12 636	26	57	0.950	0.585	12 636	32	60	
	8			16 848	45	64			16 848	47	65			16 848	57	67	
	10			21 060	70	70			21 060	74	71			21 060	89	73	
1050	4			8 845	11	46			8 845	12	47			8 845	14	49	
	6	0.935	0.614	13 268	25	57	0.945	0.614	13 268	26	58	0.998	0.614	13 268	32	60	
	8			17 690	45	65			17 690	47	65			17 690	57	67	
	10			22 113	70	70			22 113	74	71			22 113	89	73	
1100	4			9 266	11	47			9 266	12	47			9 266	14	50	
	6	0.979	0.644	13 900	25	57	0.990	0.644	13 900	26	58	1.045	0.644	13 900	32	60	
	8			18 533	45	65			18 533	47	65			18 533	57	68	
	10			23 166	70	71			23 166	73	71			23 166	89	74	
1150	4			9 688	11	47			9 688	12	47			9 688	14	50	
	6	1.024	0.673	14 531	25	57	1.035	0.673	14 531	26	58	1.093	0.673	14 531	32	60	
	8			19 375	45	65			19 375	47	65			19 375	57	68	
	10			24 219	70	71			24 219	74	71			24 219	89	74	
1200	4			10 109	11	47			10 109	12	48			10 109	14	50	
	6	1.068	0.702	15 163	25	58	1.080	0.702	15 163	26	58	1.140	0.702	15 163	32	61	
	8			20 218	45	65			20 218	47	66			20 218	57	68	
	10			25 272	70	71			25 272	74	71			25 272	89	74	
1250	4			10 530	11	47			10 530	12	48			10 530	14	50	
	6	1.113	0.731	15 795	25	58	1.125	0.731	15 795	26	58	1.188	0.731	15 795	32	61	
	8			21 060	45	65			21 060	47	66			21 060	57	68	
	10			26 325	70	71			26 325	74	72			26 325	89	74	

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		height H [mm]															
		1010					1050					1100					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	110	4	0.111	0.073	1 058	12	38	0.116	0.073	1 058	13	39	0.121	0.073	1 058	15	41
		6			1 587	28	49			1 587	29	49			1 587	33	51
		8			2 116	50	57			2 116	51	57			2 116	59	59
		10			2 645	77	62			2 645	79	63			2 645	93	65
	150	4	0.152	0.100	1 443	12	40	0.158	0.100	1 443	13	40	0.165	0.100	1 443	15	42
		6			2 164	28	50			2 164	29	51			2 164	33	53
		8			2 886	50	58			2 886	51	58			2 886	59	60
		10			3 607	77	64			3 607	79	64			3 607	93	66
	200	4	0.202	0.134	1 924	12	41	0.210	0.134	1 924	13	41	0.220	0.134	1 924	15	43
		6			2 886	28	52			2 886	29	52			2 886	33	54
		8			3 848	50	59			3 848	51	59			3 848	59	61
		10			4 810	77	65			4 810	79	65			4 810	93	67
	250	4	0.253	0.167	2 405	12	42	0.263	0.167	2 405	13	42	0.275	0.167	2 405	15	44
		6			3 607	28	53			3 607	29	53			3 607	33	55
		8			4 810	50	60			4 810	51	60			4 810	59	62
		10			6 012	77	66			6 012	79	66			6 012	93	68
	300	4	0.303	0.200	2 886	12	43	0.315	0.200	2 886	13	43	0.330	0.200	2 886	15	45
		6			4 329	28	53			4 329	29	54			4 329	33	56
		8			5 772	50	61			5 772	51	61			5 772	59	63
		10			7 214	77	67			7 214	79	67			7 214	93	69
	350	4	0.354	0.234	3 367	12	43	0.368	0.234	3 367	13	44	0.385	0.234	3 367	15	46
		6			5 050	28	54			5 050	29	54			5 050	33	56
		8			6 733	50	62			6 733	51	62			6 733	59	64
		10			8 417	77	67			8 417	79	68			8 417	93	70
	400	4	0.404	0.267	3 848	12	44	0.420	0.267	3 848	13	44	0.440	0.267	3 848	15	46
		6			5 772	28	55			5 772	29	55			5 772	33	57
		8			7 695	50	62			7 695	51	62			7 695	59	64
		10			9 619	77	68			9 619	79	68			9 619	93	70
	450	4	0.455	0.301	4 329	12	45	0.473	0.301	4 329	13	45	0.495	0.301	4 329	15	47
		6			6 493	28	55			6 493	29	55			6 493	33	57
		8			8 657	50	63			8 657	51	63			8 657	59	65
		10			10 822	77	68			10 822	79	69			10 822	93	71
	500	4	0.505	0.334	4 810	12	45	0.525	0.334	4 810	13	45	0.550	0.334	4 810	15	47
		6			7 214	28	56			7 214	29	56			7 214	33	58
		8			9 619	50	63			9 619	51	63			9 619	59	65
		10			12 024	77	69			12 024	79	69			12 024	93	71
	550	4	0.556	0.367	5 291	12	45	0.578	0.367	5 291	13	46	0.605	0.367	5 291	15	48
		6			7 936	28	56			7 936	29	56			7 936	33	58
		8			10 581	50	63			10 581	51	64			10 581	59	66
		10			13 226	77	69			13 226	79	70			13 226	93	72
600	4	0.606	0.401	5 772	12	46	0.630	0.401	5 772	13	46	0.660	0.401	5 772	15	48	
	6			8 657	28	56			8 657	29	57			8 657	33	59	
	8			11 543	50	64			11 543	51	64			11 543	59	66	
	10			14 429	77	70			14 429	79	70			14 429	93	72	
650	4	0.657	0.434	6 252	12	46	0.683	0.434	6 252	13	46	0.715	0.434	6 252	15	48	
	6			9 379	28	57			9 379	29	57			9 379	33	59	
	8			12 505	50	64			12 505	51	65			12 505	59	67	
	10			15 631	77	70			15 631	79	70			15 631	93	72	

mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		1010					1050					1100					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	700	4	0.707	0.468	6 733	12	46	0.735	0.468	6 733	13	47	0.770	0.468	6 733	15	49
		6			10 100	28	57			10 100	29	57			10 100	33	59
		8			13 467	50	65			13 467	51	65			13 467	59	67
		10			16 834	77	70			16 834	79	71			16 834	93	73
	750	4	0.758	0.501	7 214	12	47	0.788	0.501	7 214	13	47	0.825	0.501	7 214	15	49
		6			10 822	28	57			10 822	29	58			10 822	33	60
		8			14 429	50	65			14 429	51	65			14 429	59	67
		10			18 036	77	71			18 036	79	71			18 036	93	73
	800	4	0.808	0.534	7 695	12	47	0.840	0.534	7 695	13	47	0.880	0.534	7 695	15	49
		6			11 543	28	58			11 543	29	58			11 543	33	60
		8			15 391	50	65			15 391	51	65			15 391	59	67
		10			19 238	77	71			19 238	79	71			19 238	93	73
	850	4	0.859	0.568	8 176	12	47	0.893	0.568	8 176	13	48	0.935	0.568	8 176	15	50
		6			12 264	28	58			12 264	29	58			12 264	33	60
		8			16 353	50	65			16 353	51	66			16 353	59	68
		10			20 441	77	71			20 441	79	72			20 441	93	74
	900	4	0.909	0.601	8 657	12	48	0.945	0.601	8 657	13	48	0.990	0.601	8 657	15	50
		6			12 986	28	58			12 986	29	58			12 986	33	60
		8			17 315	50	66			17 315	51	66			17 315	59	68
		10			21 643	77	71			21 643	79	72			21 643	93	74
	950	4	0.960	0.635	9 138	11	46	0.998	0.635	9 138	13	48	1.045	0.635	9 138	15	50
		6			13 707	25	57			13 707	29	59			13 707	33	61
		8			18 276	44	64			18 276	51	66			18 276	59	68
		10			22 846	69	70			22 846	79	72			22 846	93	74
	1000	4	1.010	0.668	9 619	11	46	1.050	0.668	9 619	13	48	1.100	0.668	9 619	15	50
		6			14 429	25	57			14 429	29	59			14 429	33	61
		8			19 238	44	65			19 238	51	66			19 238	59	68
		10			24 048	69	70			24 048	79	72			24 048	93	74
	1050	4	1.061	0.701	10 100	11	47	1.103	0.701	10 100	13	49	1.155	0.701	10 100	15	51
		6			15 150	25	57			15 150	29	59			15 150	33	61
		8			20 200	44	65			20 200	51	67			20 200	59	69
		10			25 250	69	71			25 250	79	72			25 250	93	74
	1100	4	1.111	0.735	10 581	11	47	1.155	0.735	10 581	13	49	1.210	0.735	10 581	15	51
		6			15 872	25	57			15 872	29	59			15 872	33	61
		8			21 162	44	65			21 162	51	67			21 162	59	69
		10			26 453	69	71			26 453	79	73			26 453	93	75
	1150	4	1.162	0.768	11 062	11	47	1.208	0.768	11 062	13	49	1.265	0.768	11 062	15	51
		6			16 593	25	58			16 593	29	60			16 593	33	62
		8			22 124	44	65			22 124	51	67			22 124	59	69
		10			27 655	69	71			27 655	79	73			27 655	93	75
1200	4	1.212	0.802	11 543	11	47	1.260	0.802	11 543	13	49	1.320	0.802	11 543	15	51	
	6			17 315	25	58			17 315	29	60			17 315	33	62	
	8			23 086	44	65			23 086	51	67			23 086	59	69	
	10			28 858	69	71			28 858	79	73			28 858	93	75	
1250	4	1.263	0.835	12 024	11	47	1.313	0.835	12 024	13	49	1.375	0.835	12 024	15	51	
	6			18 036	25	58			18 036	29	60			18 036	33	62	
	8			24 048	44	66			24 048	51	67			24 048	59	69	
	10			30 060	69	71			30 060	79	73			30 060	93	75	

mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]														
		1130					1200					1250				
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]
110	4	0.124	0.083	1 190	12	39	0.132	0.083	1 190	13	40	0.138	0.092	1 321	11	37
	6			1 784	27	49			1 784	30	51			1 982	24	48
	8			2 379	49	57			2 379	54	58			2 642	43	55
	10			2 974	76	63			2 974	84	64			3 303	66	61
150	4	0.170	0.113	1 622	12	40	0.180	0.113	1 622	13	41	0.188	0.125	1 801	11	39
	6			2 433	27	51			2 433	30	52			2 702	24	49
	8			3 244	49	58			3 244	54	59			3 603	43	57
	10			4 055	76	64			4 055	84	65			4 504	66	63
200	4	0.226	0.150	2 163	12	41	0.240	0.150	2 163	13	42	0.250	0.167	2 402	11	39
	6			3 244	27	51			3 244	30	53			3 603	24	50
	8			4 326	49	59			4 326	54	60			4 804	43	57
	10			5 407	76	65			5 407	84	66			6 005	66	63
250	4	0.283	0.188	2 704	12	42	0.300	0.188	2 704	13	43	0.313	0.209	3 002	11	40
	6			4 055	27	52			4 055	30	54			4 504	24	51
	8			5 407	49	60			5 407	54	61			6 005	43	58
	10			6 759	76	66			6 759	84	67			7 506	66	64
300	4	0.339	0.225	3 244	12	43	0.360	0.225	3 244	13	44	0.375	0.250	3 603	11	41
	6			4 866	27	53			4 866	30	54			5 404	24	51
	8			6 489	49	61			6 489	54	62			7 206	43	59
	10			8 111	76	66			8 111	84	68			9 007	66	65
350	4	0.396	0.263	3 785	12	43	0.420	0.263	3 785	13	45	0.438	0.292	4 203	11	41
	6			5 678	27	54			5 678	30	55			6 305	24	52
	8			7 570	49	61			7 570	54	63			8 407	43	60
	10			9 463	76	67			9 463	84	68			10 508	66	65
400	4	0.452	0.300	4 326	12	44	0.480	0.300	4 326	13	45	0.500	0.334	4 804	11	42
	6			6 489	27	54			6 489	30	56			7 206	24	53
	8			8 652	49	62			8 652	54	63			9 608	43	60
	10			10 814	76	68			10 814	84	69			12 010	66	66
450	4	0.509	0.338	4 866	12	44	0.540	0.338	4 866	13	46	0.563	0.375	5 404	11	43
	6			7 300	27	55			7 300	30	56			8 106	24	53
	8			9 733	49	62			9 733	54	64			10 809	43	61
	10			12 166	76	68			12 166	84	70			13 511	66	66
500	4	0.565	0.376	5 407	12	45	0.600	0.376	5 407	13	46	0.625	0.417	6 005	11	43
	6			8 111	27	55			8 111	30	57			9 007	24	54
	8			10 814	49	63			10 814	54	64			12 010	43	61
	10			13 518	76	69			13 518	84	70			15 012	66	67
550	4	0.622	0.413	5 948	12	45	0.660	0.413	5 948	13	47	0.688	0.459	6 605	11	43
	6			8 922	27	56			8 922	30	57			9 908	24	54
	8			11 896	49	63			11 896	54	65			13 211	43	62
	10			14 870	76	69			14 870	84	70			16 513	66	67
600	4	0.678	0.451	6 489	12	46	0.720	0.451	6 489	13	47	0.750	0.500	7 206	11	44
	6			9 733	27	56			9 733	30	57			10 809	24	54
	8			12 977	49	64			12 977	54	65			14 412	43	62
	10			16 222	76	69			16 222	84	71			18 014	66	68
650	4	0.735	0.488	7 029	12	46	0.780	0.488	7 029	13	47	0.813	0.542	7 806	11	44
	6			10 544	27	56			10 544	30	58			11 709	24	55
	8			14 059	49	64			14 059	54	65			15 612	43	62
	10			17 573	76	70			17 573	84	71			19 516	66	68

mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

B – nominal width [mm]
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S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		1130					1200					1250					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B [mm]	700	4	0.791	0.526	7 570	12	46	0.840	0.526	7 570	13	48	0.875	0.584	8 407	11	44
		6			11 355	27	57			11 355	30	58			12 610	24	55
		8			15 140	49	64			15 140	54	66			16 813	43	63
		10			18 925	76	70			18 925	84	71			21 017	66	68
	750	4	0.848	0.563	8 111	12	47	0.900	0.563	8 111	13	48	0.938	0.626	9 007	11	45
		6			12 166	27	57			12 166	30	58			13 511	24	55
		8			16 222	49	65			16 222	54	66			18 014	43	63
		10			20 277	76	70			20 277	84	72			22 518	66	69
	800	4	0.904	0.601	8 652	12	47	0.960	0.601	8 652	13	48	1.000	0.667	9 608	11	45
		6			12 977	27	57			12 977	30	59			14 412	24	56
		8			17 303	49	65			17 303	54	66			19 215	43	63
		10			21 629	76	71			21 629	84	72			24 019	66	69
	850	4	0.961	0.638	9 192	12	47	1.020	0.638	9 192	13	48	1.063	0.709	10 208	11	45
		6			13 788	27	58			13 788	30	59			15 312	24	56
		8			18 384	49	65			18 384	54	66			20 416	43	63
		10			22 981	76	71			22 981	84	72			25 520	66	69
	900	4	1.017	0.676	9 733	12	47	1.080	0.676	9 733	13	49	1.125	0.751	10 809	11	46
		6			14 599	27	58			14 599	30	59			16 213	24	56
		8			19 466	49	65			19 466	54	67			21 617	43	64
		10			24 332	76	71			24 332	84	73			27 022	66	69
	950	4	1.074	0.713	10 274	11	47	1.140	0.713	10 274	13	49	1.188	0.792	11 409	11	47
		6			15 411	24	57			15 411	30	60			17 114	24	57
		8			20 547	43	65			20 547	54	67			22 818	43	65
		10			25 684	67	70			25 684	84	73			28 523	66	71
	1000	4	1.130	0.751	10 814	11	47	1.200	0.751	10 814	13	50	1.250	0.834	12 010	11	47
		6			16 222	24	57			16 222	30	60			18 014	24	58
		8			21 629	43	65			21 629	54	68			24 019	43	65
		10			27 036	67	71			27 036	84	73			30 024	66	71
	1050	4	1.187	0.789	11 355	11	47	1.260	0.789	11 355	13	50	1.313	0.876	12 610	11	47
		6			17 033	24	58			17 033	30	60			18 915	24	58
		8			22 710	43	65			22 710	54	68			25 220	43	65
		10			28 388	67	71			28 388	84	74			31 525	66	71
	1100	4	1.243	0.826	11 896	11	47	1.320	0.826	11 896	13	50	1.375	0.917	13 211	11	47
		6			17 844	24	58			17 844	30	61			19 816	24	58
		8			23 792	43	65			23 792	54	68			26 421	43	65
		10			29 740	67	71			29 740	84	74			33 026	66	71
	1150	4	1.300	0.864	12 437	11	47	1.380	0.864	12 437	13	50	1.438	0.959	13 811	11	48
		6			18 655	24	58			18 655	30	61			20 717	24	58
		8			24 873	43	65			24 873	54	68			27 622	43	66
		10			31 091	67	71			31 091	84	74			34 528	66	71
1200	4	1.356	0.901	12 977	11	48	1.440	0.901	12 977	13	50	1.500	1.001	14 412	11	48	
	6			19 466	24	58			19 466	30	61			21 617	24	58	
	8			25 955	43	66			25 955	54	68			28 823	43	66	
	10			32 443	67	71			32 443	84	74			36 029	66	72	
1250	4	1.413	0.939	13 518	11	48	1.500	0.939	13 518	13	51	1.563	1.043	15 012	11	48	
	6			20 277	24	58			20 277	30	61			22 518	24	59	
	8			27 036	43	66			27 036	54	69			30 024	43	66	
	10			33 795	67	72			33 795	84	74			37 530	66	72	

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

mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

14.7 | Estimated weights of mcr WIP PRO/V, mcr WIP PRO/V-M dampers [kg]

		width B [mm]										
		263	300	400	500	600	700	800	900	1000	1100	1250
height H [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	122
	1000	28	33	42	53	65	76	85	97	108	117	136
	1100	31	37	46	58	72	84	93	107	119	128	150
1250	34	41	50	63	79	92	101	117	130	139	164	

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

14.8 | Accessories

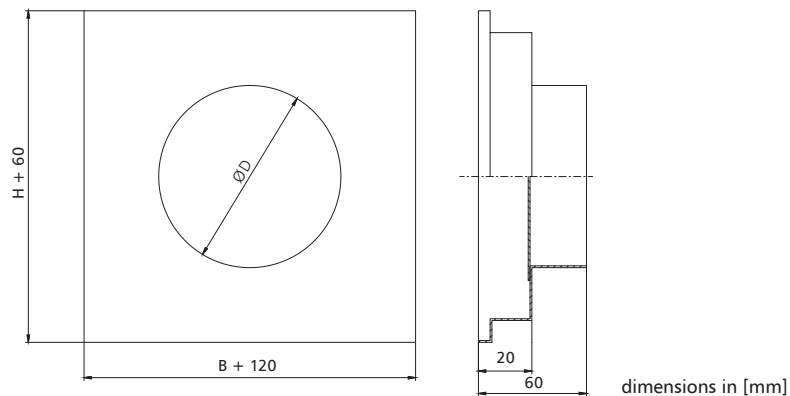
14.8.1 | mcr KRP connection stub

mcr KRP connection stubs are used to connect a circular ventilation duct to a rectangular damper. The connection is a „bare end“ pipe. The diameter of the stub pipe is 2 mm smaller than the diameter of the ventilation duct.

Dimensions:

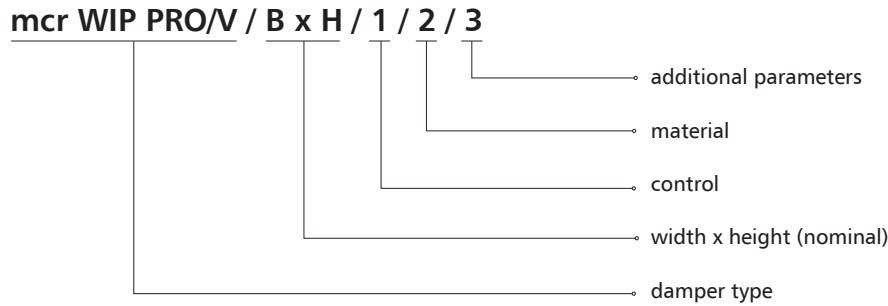
BxH - damper dimensions [mm]

ØD - diameter of the connection duct [mm]



mcr WIP PRO/V, mcr WIP PRO/V-M | Multi-blade smoke control dampers for multi-compartment fire ventilation systems

14.9 | Marking



1 - control:

» trigger and control mechanism, axial actuator

- BE24 – actuator without a return spring, U = 24 V AC/DC
- BE24-ST (with the BKE230-24 option) – actuator without a return spring, for the SBS Control system
- BE230 – actuator without a return spring, U = 230 V AC/DC
- BEE24 – actuator without a return spring, U = 24 V AC/DC
- BEE24-ST (with the BKE230-24 option) – actuator without a return spring, for the SBS Control system
- BEE230 – actuator without a return spring, U = 230 V AC/DC
- BEN24 – actuator without a return spring, U = 24 V AC/DC
- BEN24-ST (with the BKE230-24 option) – actuator without a return spring, for the SBS Control system
- BEN230 – actuator without a return spring, U = 230 V AC/DC

2 - material:

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

3 - additional parameters :

» Damper axis of rotation

- [no symbol] – horizontal axis of rotation
- PP_D – vertical axis of rotation – mechanism at the bottom of the damper
- PP_G – vertical axis of rotation - mechanism at the top of the damper

» Design standard

- [no symbol] – left damper
- KP – right damper
- LC – actuator long casing

NOTE: separate additional parameters entered with the “/” sign example marking:

mcr WIP PRO/V 400 x 400 BLE24

EIS120 louvered smoke ventilation damper with a 24 V actuator with limit switches.

Chapter 16 - power supply and control (p. 262) contains the following information:
- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper.



downloadable models
on the website
under the designer zone tab



- » **E120**
- » Fire resistance class: E120 ($v_e h_o i \leftrightarrow o$).
- » 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.

15.1| 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 are opened. The dampers switch to safe mode (close):

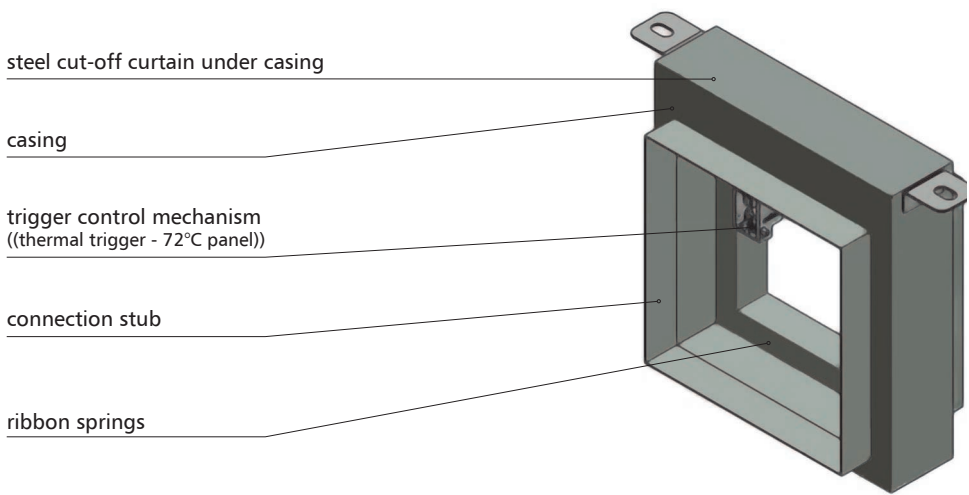
- » automatically, by means of thermal trigger tripping at 72°C,
- » manually (in test mode), by pressing the manual release button (trigger control mechanism),
- » remotely, by means of EM electromagnetic trigger tripping (optional).

Admissible flow velocity in the connected duct is 15 m/s. Dampers with EM electromagnetic triggers (optional) close as a result of cutting the power supply as a result of 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 drive spring action in the damper, activated by the triggering of the thermal trigger or manually, by pressing the dedicated button on the panel. Dampers are opened manually, by lifting the steel curtain and locking it in the trigger control mechanism clamps.

mcr FS dampers may also be used in the systems which are protecting egress routes from smoke, in which case they remain open during the fire and ensure a supply of fresh air to egress routes. If the fire develops further, the dampers are automatically closed as a result of thermal trigger tripping to prevent fire spreading.

15.2| Design



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 galvanized steel sheets. 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 stub with the length of 38 mm for rectangular dampers and 60 mm for circular dampers. The damper blade is made of steel sheets. The steel flat bar on the casing exterior is installed to tighten the device after its activation.

The mechanism of 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.

15.3 | Versions

15.3.1 | mcr FS I/F – cut-off fire damper for E120(v_e h_o i↔o) rigid walls and floor slabs



insert symmetrically against the wall axis

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

The stainless steel cut-off curtain falls when 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.

15.3.2 | mcr FS DWFX-C – cut-off damper for E120(v_e i↔o) light walls



insert symmetrically against the wall axis

The mcr FS DWFX-C damper is suitable for installation in newly built light walls

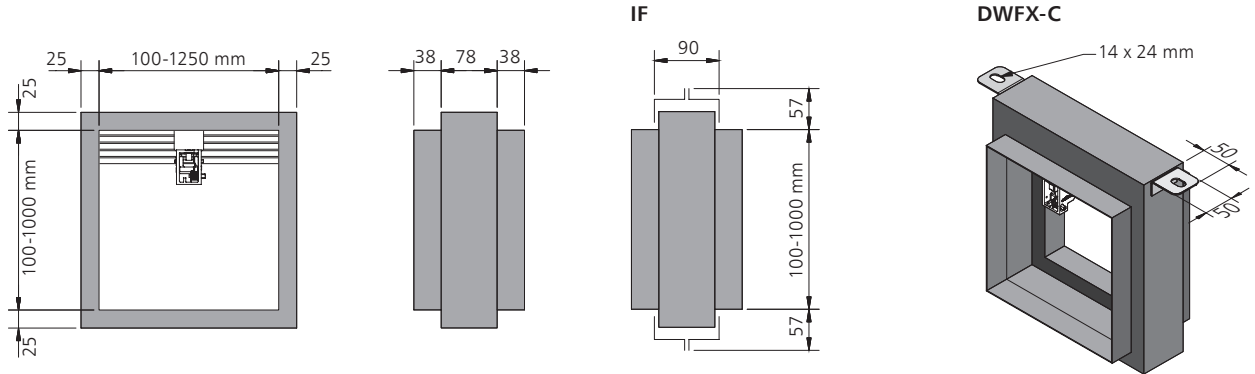
The stainless steel cut-off curtain falls when 72°C is exceeded or if the voltage is removed from the EM trigger control mechanism (optional).

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

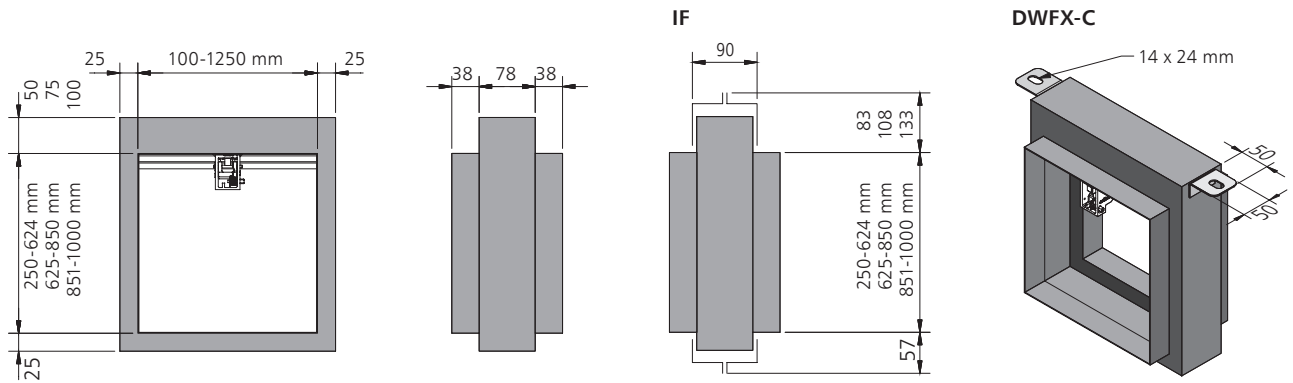
15.4 | Dimensions

mcr FS dampers are manufactured in three series:

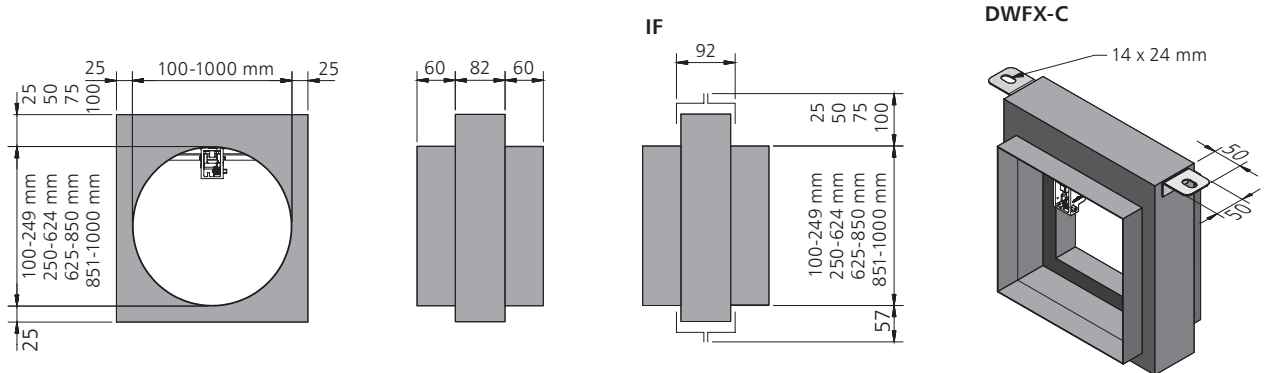
» **101 series** (rectangular dampers) with a curtain located partly in the air stream – from 100 x 100 mm to 1250 x 1000 mm.



» **201 series** (rectangular dampers) with a curtain located outside the air stream – from 100 x 250 mm to 1250 x 1000 mm.



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



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

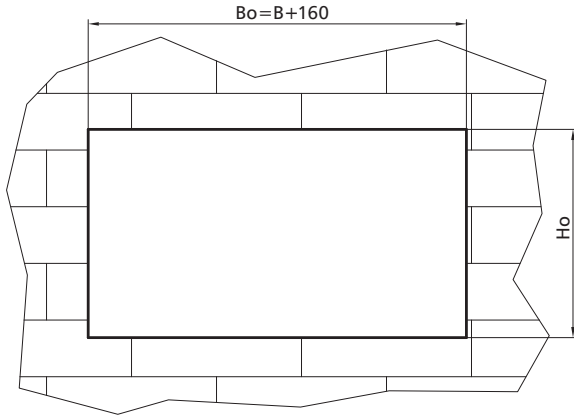
15.5 | Installation

mcr FS I/F dampers are rated E120(v_e h_o $i \leftrightarrow o$) if installed in partitions made of concrete, full bricks or aerated concrete blocks with a thickness of at least 110 mm and concrete floor slabs with a thickness of at least 150 mm.

mcr FS DWFX-C dampers are rated E120(v_e $i \leftrightarrow o$) if installed in light walls with gypsum boards on a steel framework with the thickness of at least 125 mm.

15.5.1 | Preparation of installation openings

» mcr FS I/F version – preferred opening

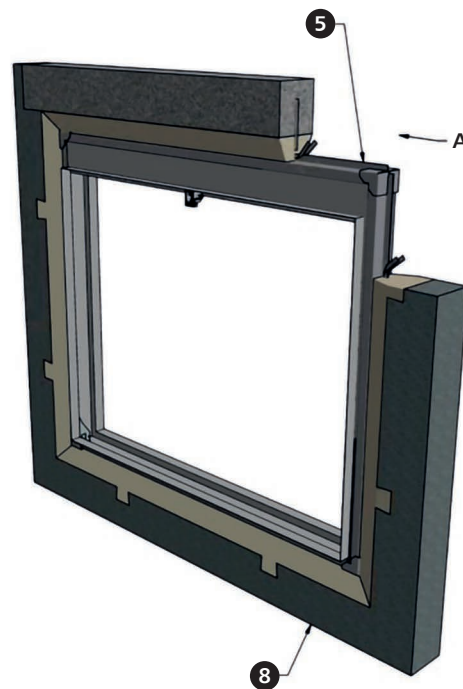
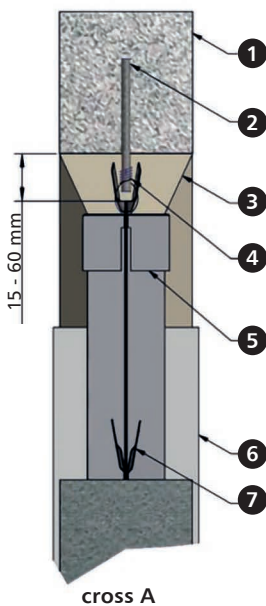


» mcr FS DWFX-C version

Dampers are installed during the construction of the gypsum board wall (the damper is embedded in the board wall).

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

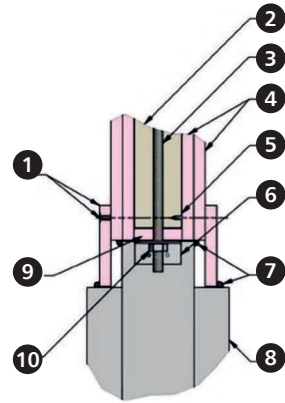
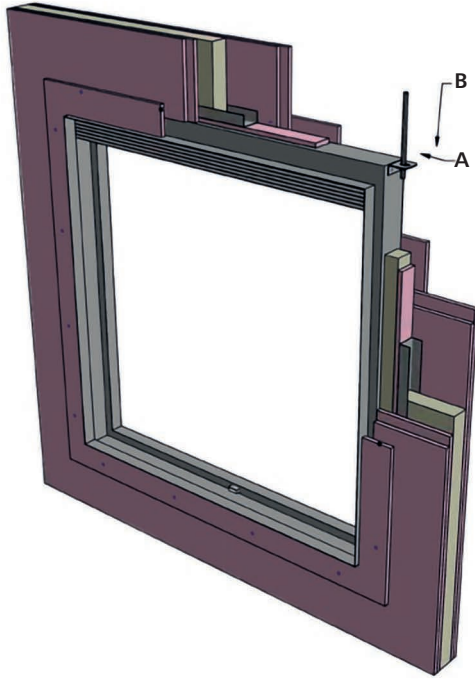
15.5.2 | Sample installation of mcr FS I/F dampers



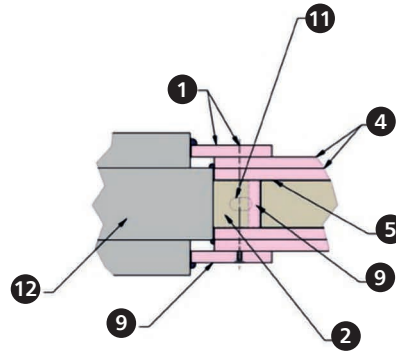
1. lintel
2. steel anchors \varnothing min. 6.5 mm
3. grout 4:1 sand:cement
4. steel wire \varnothing 1.5 mm binding the anchors with frame runners

5. installation frame
6. mcr FS fire damper
7. frame runners - for bending sideways and downwards
8. rigid partition

15.5.3 | Sample installation of mcr FS DWFX-C dampers



cross-section A



cross-section A

1. 12.5 x 100 mm circumferential gypsum board trim fixed to the gypsum board wall through a UD50 profile with 300 mm bolts
2. mineral wool 33 kg/m³
3. M10 rod (pin)
4. gypsum boards 2 x 12.5 mm
5. UD50 profile
6. angle profile welded to both ends of the casing

7. low-expansion intumescent compound around the damper, on both sides
8. damper casing
9. gypsum board trim 12.5 mm
10. M10 nut
11. angle profile with an opening
12. mcr FS fire damper

15.6 | mcr FS curtain dampers technical parameters

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

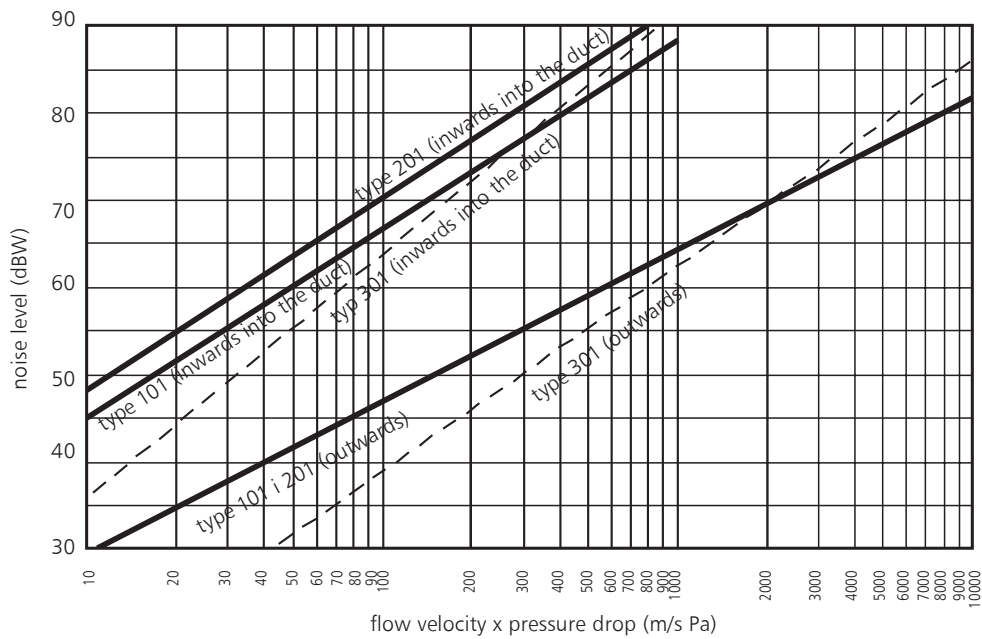
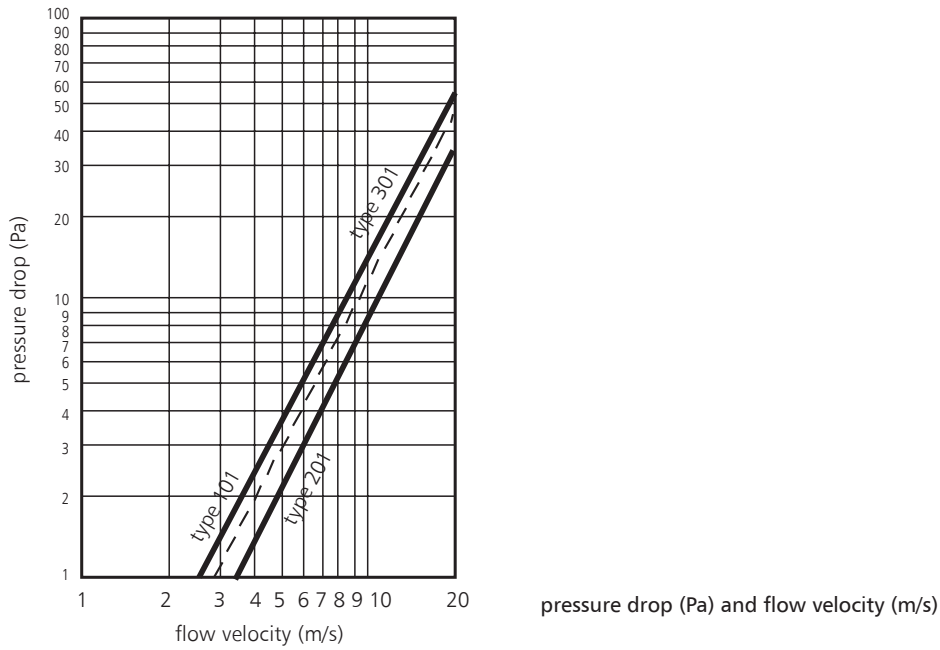
101 series															
H \ B	100	200	300	400	500	600	700	800	900	1000	1100	1200	1250		
100	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	150	
200	0.02	0.04	0.06	0.08	0.10	0.12	0.14	0.16	0.18	0.20	0.22	0.24	0.25	250	
300	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	0.30	0.33	0.36	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	100	200	300	400	500	600	700	800	900	1000	
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 Designer Zone.

15.6.1 | Flow characteristics



flow velocity (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
type 101	dB	10	7	3	9	13	20	30	33
type 201	dB	10	7	3	9	13	20	30	33
type 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
type 101	dB	4	12	16	18	22	20	32	38
type 201	dB	4	11	17	19	22	30	33	40
type 301	dB	4	10	16	18	21	24	30	38

15.7 | Weights of mcr FS curtain dampers

approximate damper weights [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	42.5	27.8	30.4	32.8	35.2	38.9	42.0

15.8 | Options

15.8.1 | EM trigger control mechanism

» mechanism operation description:

The EM mechanism is designed to operate mcr FS transfer dampers. Once power supply voltage is removed, the mechanism lock is released, which causes 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 a 24 V AC/DC voltage – released by the removal of the power supply voltage

EM240 – mechanism supplied with a 230 V AC voltage – released by the removal of the power supply voltage

specifications

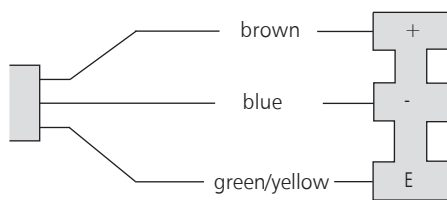
	EM24	EM240
power supply voltage	24 V AC / DC	230 V AC 50 Hz
rated current	120 m A	10 m A
electrical connection	wire 3 x 0.75 mm ²	
weight	1.6 kg	1.6 kg

» mechanism electrical diagram

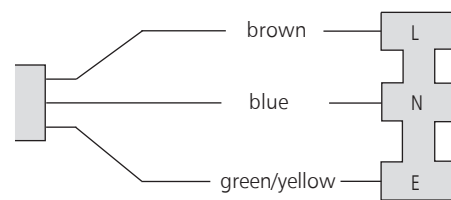
» power supply:

brown wire – “+” supply or “L” blue wire – mass “-” or “N” green-yellow wire – ground “E”

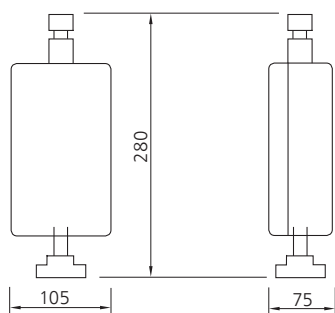
» 24 V AC/DC



» 230 V AC



» mechanism dimensions



15.8.2 | MSSP and MSDP independent limit switches

» **mechanism operation description:**

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

» **versions:**

MSSP – single switch – closed damper blade signaling.

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

specifications

service life	5 000 000 cycles
limit switch operating temperature	-25°C do +85°C
service life	5 000 000 cycles
voltage	300 V AC i 250 V DC
current	10 A
limit switch operating temperature	-25°C do +85°C
service life	5 000 000 cycles

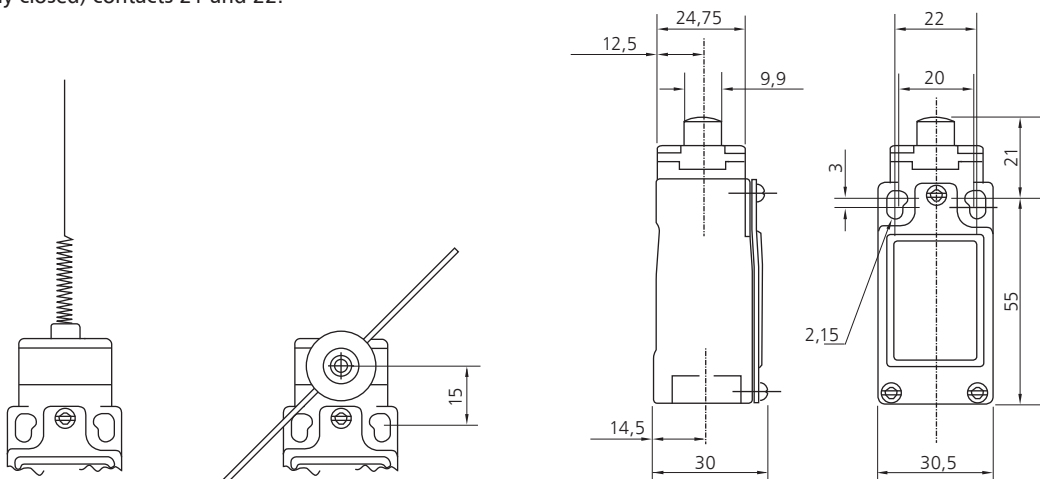
» **mechanism electrical diagram:**

MSSP – single limit switch, closed damper signaling:

MSDP – two limit switches:

» NO (normally open) contacts 13 and 14

» NC (normally closed) contacts 21 and 22.



15.9 | Marking

mcr FS 201 / IF / B x H / MSSP



type:

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

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

mcr FS 301 - circular damper with a curtain located 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)

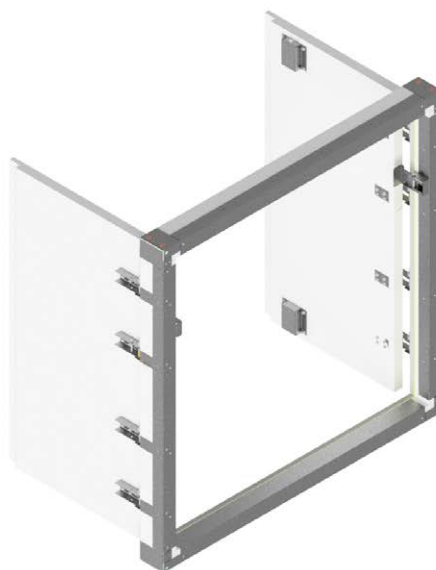
MSDP - two single limit switches (closed and open damper signaling)

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

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



downloadable models
on the website
under the designer zone tab



» **EIS180**

- » Fire resistance class: EI180 ($v_{ed} i \leftrightarrow o$)S1500C₃₀₀AAmulti.
- » Certificate of constancy of performance.
- » Dampers certified for compliance with EN 12101-8.
- » Dampers rated under EN 13501-4 and tested under EN 1366-10.
- » Smoke door dampers resistance independent of airflow direction and installation side.
- » Large active area, small resistances.
- » Certified installation with a system grille in set.

16.1 | Application

mcr DOR smoke door dampers are intended for installation in automatically operated fire ventilation systems. The devices are used in fire ventilation systems. The dampers prevent fire, smoke and fire gases from spreading to the adjacent zones. During normal system operation, the damper blade is closed. The fire damper blade in the fire compartment is opened, whereas in other areas the blades are closed. Admissible flow velocity in the connected duct is 15 m/s.

16.2 | Design

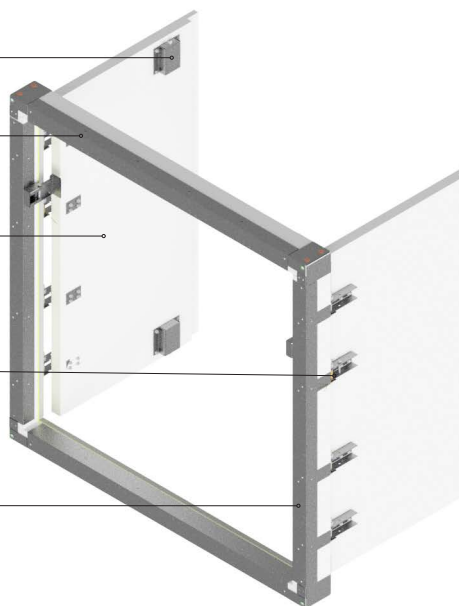
trigger control mechanism

casing

blade

hinge

steel reinforcement



mcr DOR smoke door dampers consist of a casing with a rectangular cross-section composed of fire-proof boards, a moving damper blade in the form of two wings and an automatically activated trigger and control mechanism. Special design casing with impregnated fire-proof boards are used in chemically aggressive environments. The damper casing total thickness is 110 mm. The damper blade is made of a fire-proof panel with the total thickness of 40 mm. At the corners and along the entire perimeter of the casing, there are steel reinforcements with a rivet nut system, enabling the installation of masking grilles and frames for connecting steel ventilation ducts.

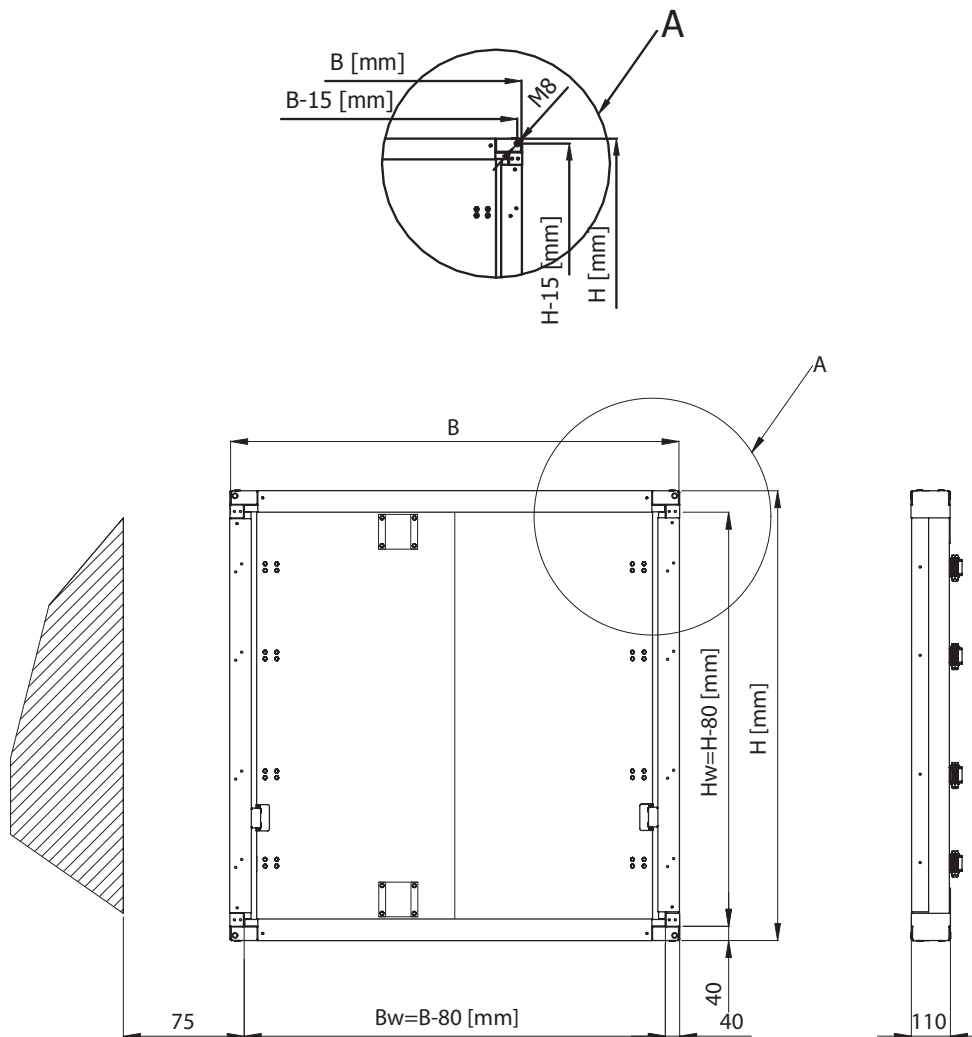
16.3 | Versions

16.3.1 | Opening with the trigger and control mechanism

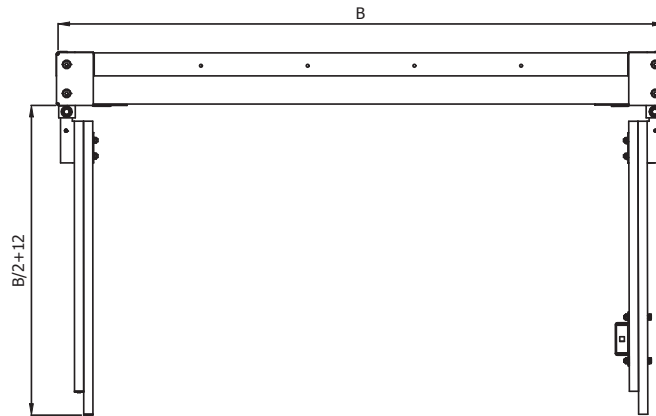
During normal operation, the fire damper blade remains closed. In the case of fire, the damper blade in the compartment where the fire occurs opens and the damper blades in the remaining compartments remain closed – the blades are operated remotely by supplying power.

mcr DOR dampers are equipped with a EM24D-type trigger and control mechanisms, supplied with 24 V AC/DC or 230 V AC. Dampers are equipped with limit switches used to monitor the position of the damper blade. The trigger and control mechanism is located inside the damper casing.

The dampers open as the result of power voltage supply to the trigger and control mechanism (current pulse of at least 5 s). Closing the damper blade after its tripping is possible manually, provided that there is no power supply to the trigger and control mechanism.



16.4 | Dimensions

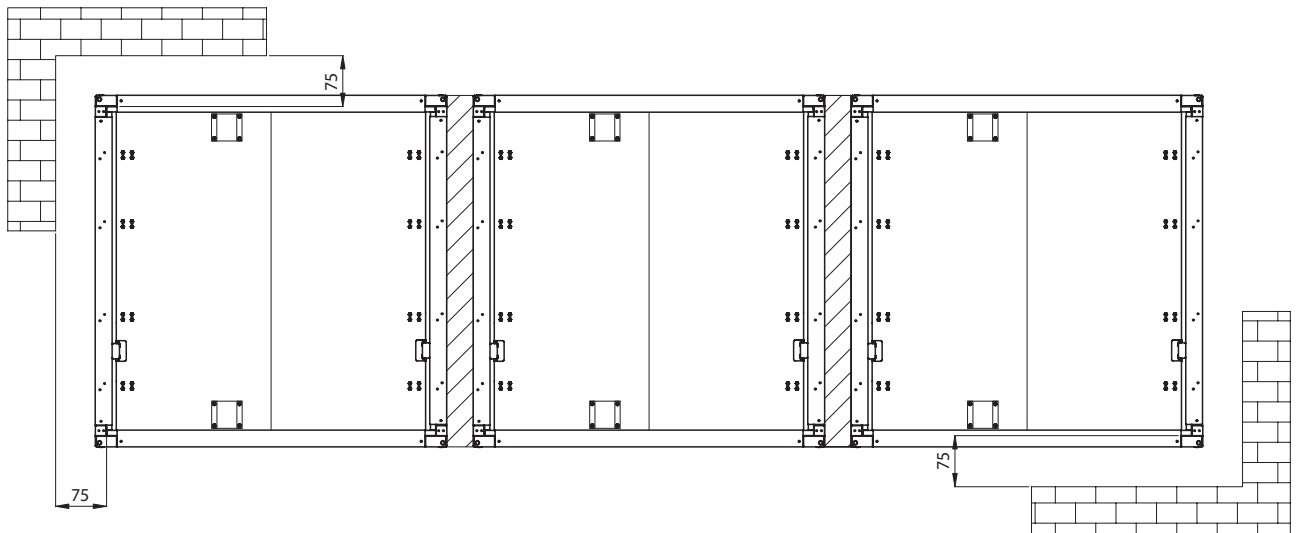


Rectangular dampers:

- » nominal width B: from 480 mm to 1330 mm (Bw from 400 mm to 1250 mm)
- » nominal height H: from 380 mm to 1330 mm (Hw from 300 mm to 1250 mm)
- » maximum cross-section surface of one damper up to 1.77 m²
- » the damper blade, regardless of the dimensions of the BxH damper, does not protrude beyond the device casing on one side
- » the open damper blade (wings) does not protrude outside the B dimension of the device casing

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

Distance between systems and partitions



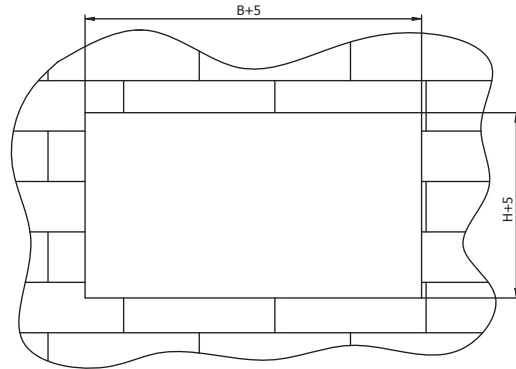
dimensions in [mm]

16.5 | Installation

mcr DOR door-type smoke exhaust dampers are rated EI180($v_{ed} i \leftrightarrow o$) S1500 C₃₀₀ AA multi multi if installed on fireproof ducts classified according to EN 1366-8 and EN 1366-9.

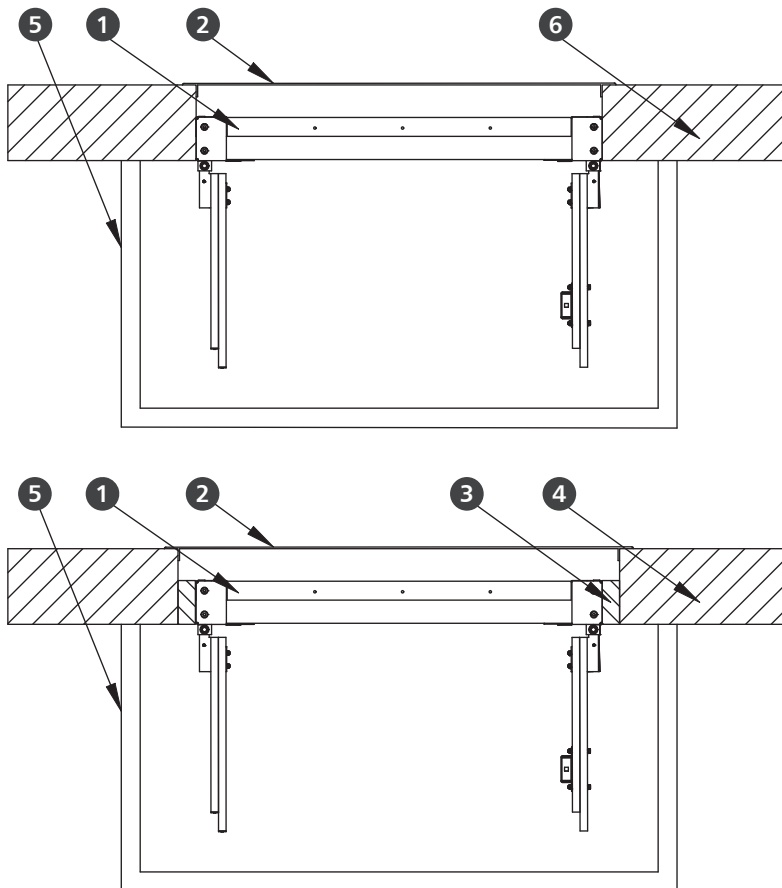
16.5.1 | Preparation of installation openings

» Preferred opening



dimensions in [mm]

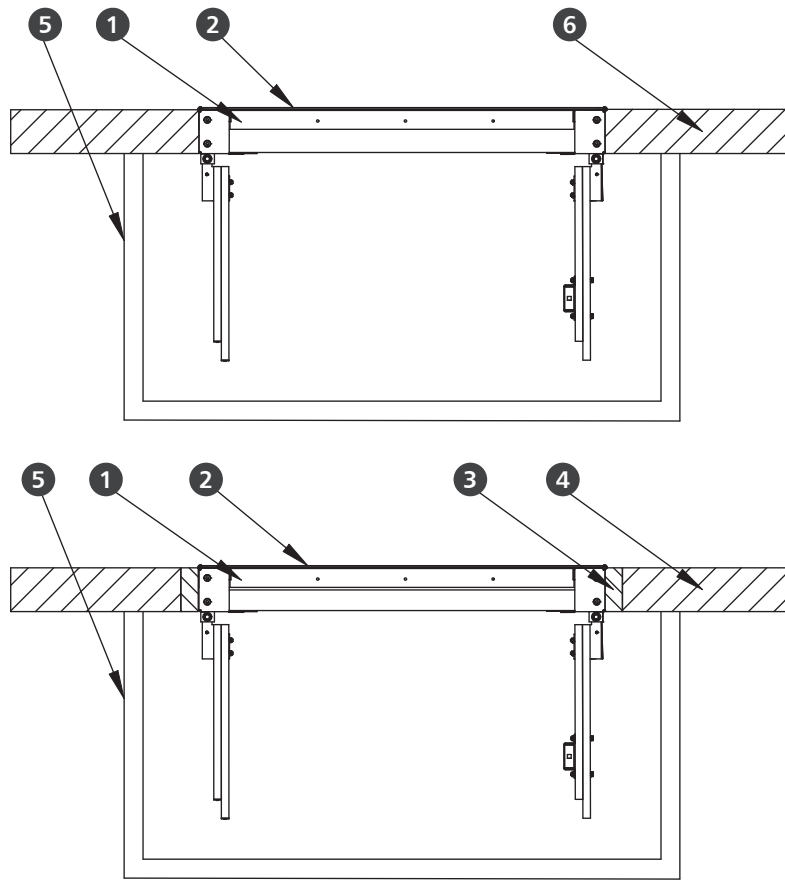
16.5.2 | Damper installation in shaft walls > 110 mm



- 1. mcr DOR BxH smoke door damper
- 2. masking grille
- 3. a strip of fire-proof board along the entire length of the BxH side

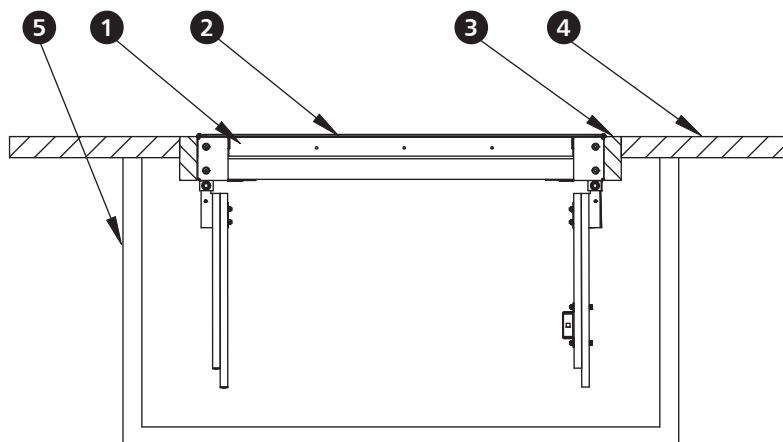
- 4. Shaft wall
- 5. Vertical fire ventilation shaft
- 6. Wall of a shaft compliant with EN1366-8 or EN1366-9

16.5.3 | Damper installation in shafts with a thickness of 110 mm



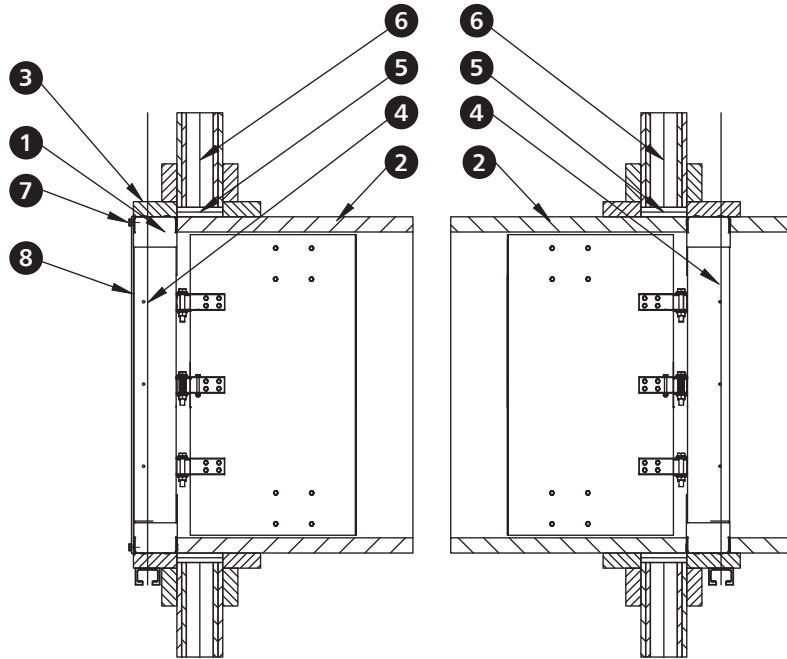
- 1. mcr DOR BxH smoke door damper
- 2. masking grille
- 3. a strip of fire-proof board along the entire length of the BxH side
- 4. Wall of a shaft compliant with EN1366-8 or EN1366-9
- 5. Vertical fire ventilation shaft

16.5.4 | Damper installation in shafts with a thickness <110 mm



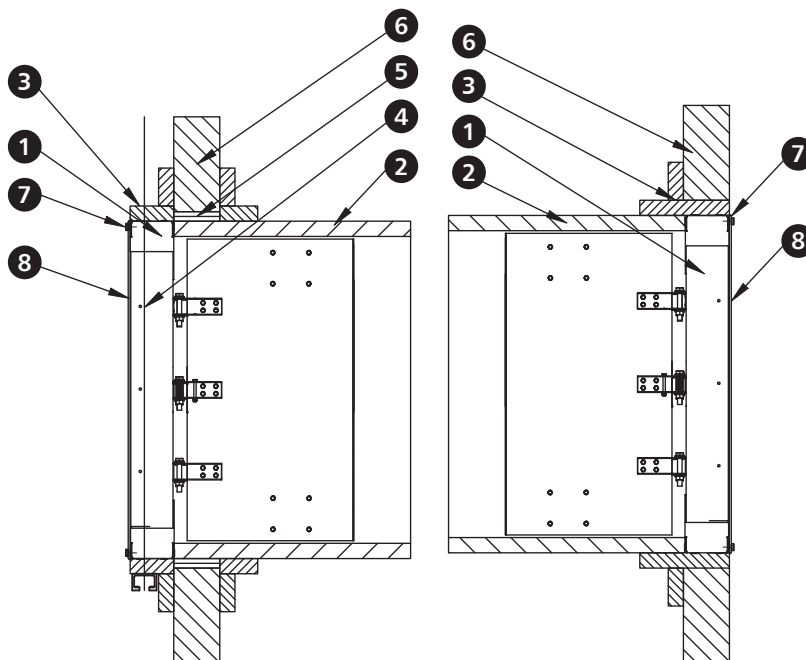
- 1. mcr DOR BxH smoke door damper
- 2. masking grille
- 3. a strip of fire-proof board along the entire length of the BxH side
- 4. Wall of a shaft compliant with EN1366-8 or EN1366-9
- 5. Vertical fire ventilation shaft

16.5.5 | Damper installation in light walls (plasterboard)



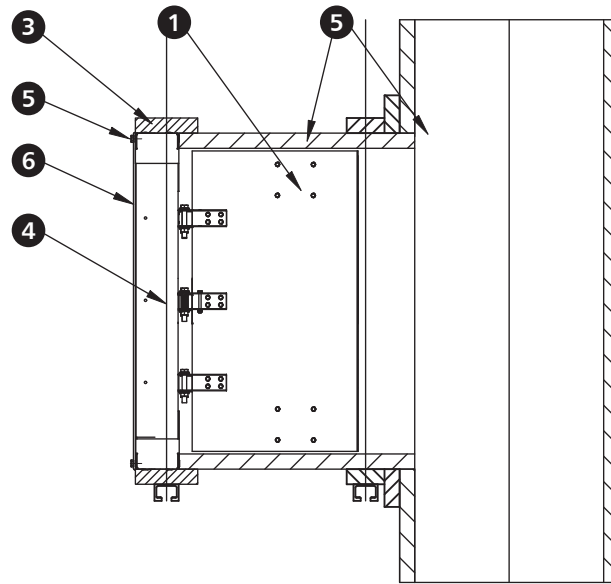
- | | |
|--|--|
| <ul style="list-style-type: none"> 1. mcr DOR BxH smoke door damper 2. multi-compartment smoke extract duct – e.g. made of fire-proof boards 3. a strip of fire-proof board along the entire length of the BxH side 4. system of installation hangers ensuring operational stability | <ul style="list-style-type: none"> 5. fireproof duct installation penetration system 6. plasterboard wall 7. M10 x 20 bolt 8. masking grille |
|--|--|

16.5.6 | Damper installation in solid walls



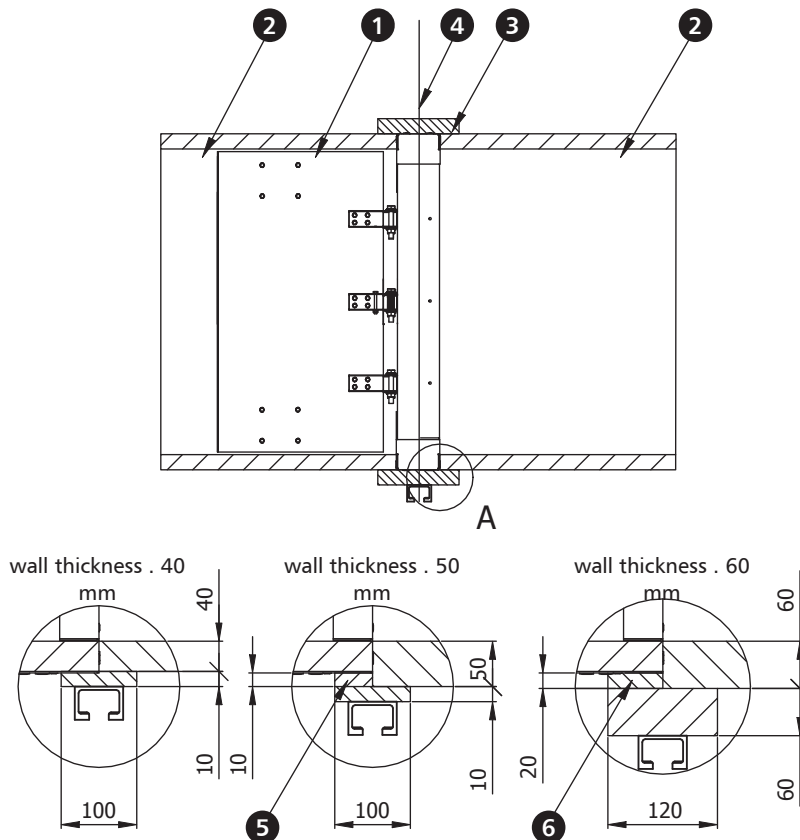
- | | |
|--|---|
| <ul style="list-style-type: none"> 1. mcr DOR BxH smoke door damper 2. multi-compartment smoke extract duct – e.g. made of fire-proof boards 3. a strip of fire-proof board along the entire length of the BxH side 4. system of installation hangers ensuring operational stability | <ul style="list-style-type: none"> 5. fireproof duct installation penetration system 6. solid wall 7. M10 x 20 bolt 8. masking grille |
|--|---|

16.5.7 | Damper installation on horizontal ducts



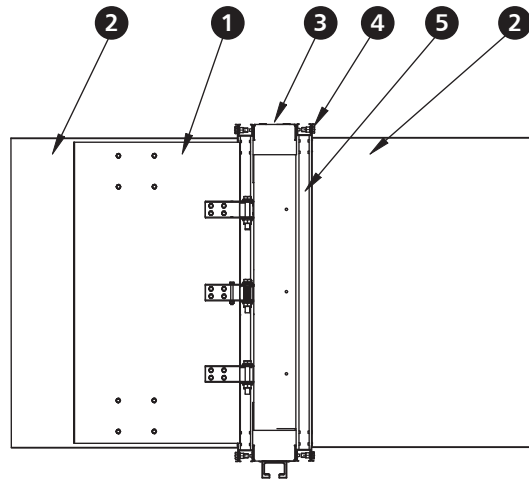
- 1. mcr DOR BxH smoke door damper
- 2. multi-compartment smoke extract duct – e.g. made of fire-proof boards
- 3. a strip of fire-proof board along the entire length of the BxH side
- 4. installation hangers system
- 5. M10 x 20 bolt
- 6. masking grille

16.5.8 | Damper connection with a multi-compartment duct, e.g. made of fire-proof boards with various wall thickness



- 1. mcr DOR BxH smoke door damper
- 2. multi-compartment smoke extract duct made of fire-proof boards
- 3. a strip of fire-proof board along the entire length of the BxH side
- 4. installation hangers system
- 5. a strip of fire-proof board along the entire length of the BxH side with the dimensions 10 x 50 mm
- 6. a strip of fire-proof board along the entire length of the BxH side with the dimensions 20 x 60 mm

16.5.9 | Damper connection with single-compartment duct, e.g. made of metal sheets



- 1. mcr DOR BxH smoke door damper
- 2. single-compartment smoke extract duct – metal sheets
- 3. installation hangers system
- 4. M10 x 20 bolt
- 5. RB mounting frame

Where a damper is installed in a duct connected on two sides, an inspection access allowing for the damper blade to be accessed freely for the purpose of closing it should be made from the side of the tripping and control mechanism.

Smoke extraction ducts should be made in accordance with the ducts manufacturer’s guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. The shut-off damper in vertical fire ventilation systems may be installed across the horizontal smoke extract duct or on the sides of the horizontal smoke extract duct or on the surface of any side of the vertical smoke extract duct. A masking grille may terminate the system.

16.6 | mcr DOR rectangular dampers technical parameters

B_w – nominal width [mm]
 H_w – nominal height [mm]

v – velocity [m/s]
 S_k – duct cross-section [m²]
 S_e – damper active cross-section [m²]

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

		height H_w [mm]										
		300					350					
		v [m/s]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]
width B_w [mm]	400	4			1 538	3	20			1 812	3	21
		6	0.120	0.107	2 307	4	24	0.140	0.126	2 717	3	24
		8			3 076	5	27			3 623	4	28
		10			3 845	6	31			4 529	6	31
	450	4			1 740	3	20			2 049	3	21
		6	0.135	0.121	2 609	3	24	0.158	0.142	3 074	3	24
		8			3 479	5	28			4 098	4	28
		10			4 349	6	31			5 123	6	31
	500	4			1 941	3	21			2 287	3	21
		6	0.150	0.135	2 912	3	24	0.175	0.159	3 430	3	25
		8			3 882	4	28			4 573	4	28
		10			4 853	6	31			5 717	6	31
	550	4			2 143	3	21			2 762	3	22
		6	0.165	0.149	3 214	3	25	0.193	0.175	4 143	3	25
		8			4 285	4	28			5 524	4	28
		10			5 357	6	32			6 905	5	32
	600	4			2 344	3	22			2 762	3	22
		6	0.180	0.163	3 516	3	25	0.210	0.192	4 143	3	25
		8			4 689	4	28			5 524	4	28
		10			5 861	6	32			6 905	5	32
	650	4			2 546	3	22			3 000	3	22
		6	0.195	0.177	3 819	3	25	0.228	0.208	4 499	3	25
		8			5 092	4	29			5 999	4	29
		10			6 365	6	32			7 499	5	32
	700	4			2 748	3	22			3 237	3	23
		6	0.210	0.191	4 121	3	25	0.245	0.225	4 856	3	26
		8			5 495	4	29			6 474	4	29
		10			6 869	6	32			8 093	5	32

B_w – nominal width [mm]
H_w – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H _w [mm]										
		300					350					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B _w [mm]	750	4			2 949	3	22			3 475	3	23
		6	0.225	0.205	4 424	3	26	0.263	0.241	5 212	3	26
		8			5 898	4	29			6 949	4	29
		10			7 373	6	32			8 687	5	32
	800	4			3 151	3	23			3 712	3	23
		6	0.240	0.219	4 726	3	26	0.280	0.258	5 568	3	26
		8			6 301	4	29			7 425	4	29
		10			7 877	5	33			9 281	5	33
	850	4			3 352	3	23			3 950	2	23
		6	0.255	0.233	5 028	3	26	0.298	0.274	5 925	3	26
		8			6 705	4	29			7 900	4	29
		10			8 381	5	33			9 875	5	33
	900	4			3 554	3	23			4 188	2	24
		6	0.270	0.247	5 331	3	26	0.315	0.291	6 281	3	26
		8			7 108	4	30			8 375	4	30
		10			8 885	5	33			10 469	5	33
	950	4			3 756	3	23			4 425	2	24
		6	0.285	0.261	5 633	3	26	0.333	0.307	6 638	3	27
		8			7 511	4	30			8 850	4	30
		10			9 389	5	33			11 063	5	33
	1000	4			3 957	3	23			3 237	2	24
		6	0.300	0.275	5 936	3	27	0.350	0.324	4 856	3	27
		8			7 914	4	30			6 474	4	30
		10			9 893	5	33			8 093	5	33
	1050	4			4 159	3	24			3 475	2	24
		6	0.315	0.289	6 238	3	27	0.368	0.340	5 212	3	27
		8			8 317	4	30			6 949	4	30
		10			10 397	5	33			8 687	5	33
	1100	4			4 360	3	24			3 712	2	24
		6	0.330	0.303	6 540	3	27	0.385	0.357	5 568	3	27
		8			8 721	4	30			7 425	4	30
		10			10 901	5	33			9 281	5	33
	1150	4			4 562	3	24			3 950	2	25
		6	0.345	0.317	6 843	3	27	0.403	0.373	5 925	3	27
		8			9 124	4	30			7 900	4	30
		10			11 405	5	34			9 875	5	34
	1200	4			4 764	3	24			4 188	2	25
		6	0.360	0.331	7 145	3	27	0.420	0.390	6 281	3	27
		8			9 527	4	30			8 375	4	31
		10			11 909	5	34			10 469	5	34
	1250	4			4 965	3	24			4 425	2	25
		6	0.375	0.345	7 448	3	27	0.438	0.406	6 638	3	28
		8			9 930	4	31			8 850	4	31
		10			12 413	5	34			11 063	5	34

B_w – nominal width [mm]
 H_w – nominal height [mm]

v – velocity [m/s]
 S_k – duct cross-section [m²]
 S_e – damper active cross-section [m²]

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

		height H_w [mm]																				
		400					450					500					550					
		v [m/s]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]
width B_w [mm]	400	4			2 085	3	21			2 359	3	21			2 632	3	22			2 906	3	22
		6	0.160	0.145	3 128	3	24	0.180	0.164	3 538	3	25	0.200	0.183	3 948	3	25	0.220	0.202	4 359	3	25
		8			4 170	4	28			4 717	4	28			5 265	4	28			5 812	4	28
		10			5 213	6	31			5 897	6	31			6 581	5	32			7 265	5	32
	450	4			2 359	3	21			2 668	3	22			2 978	3	22			3 288	2	23
		6	0.180	0.164	3 538	3	25	0.203	0.185	4 002	3	25	0.225	0.207	4 467	3	25	0.248	0.228	4 931	3	25
		8			4 717	4	28			5 337	4	28			5 956	4	28			6 575	4	29
		10			5 897	6	31			6 671	5	32			7 445	5	32			8 219	5	32
	500	4			2 632	3	22			2 978	3	22			3 324	2	23			3 669	2	23
		6	0.200	0.183	3 948	3	25	0.225	0.207	4 467	3	25	0.250	0.231	4 985	3	25	0.275	0.255	5 504	3	26
		8			5 265	4	28			5 956	4	28			6 647	4	29			7 338	4	29
		10			6 581	5	32			7 445	5	32			8 309	5	32			9 173	5	32
	550	4			2 906	3	22			3 288	2	23			4 015	2	23			4 432	2	23
		6	0.220	0.202	4 359	3	25	0.248	0.228	4 931	3	25	0.275	0.255	6 022	3	26	0.303	0.281	6 648	3	26
		8			5 812	4	28			6 575	4	29			8 029	4	29			8 865	4	29
		10			7 265	5	32			8 219	5	32			10 037	5	32			11 081	5	32
	600	4			3 180	3	22			3 597	2	23			4 015	2	23			4 432	2	24
		6	0.240	0.221	4 769	3	25	0.270	0.250	5 396	3	26	0.300	0.279	6 022	3	26	0.330	0.308	6 648	3	26
		8			6 359	4	29			7 194	4	29			8 029	4	29			8 865	4	29
		10			7 949	5	32			8 993	5	32			10 037	5	32			11 081	5	32
	650	4			3 453	2	23			3 907	2	23			4 360	2	23			4 814	2	24
		6	0.260	0.240	5 180	3	26	0.293	0.271	5 860	3	26	0.325	0.303	6 540	3	26	0.358	0.334	7 221	3	26
		8			6 906	4	29			7 813	4	29			8 721	4	29			9 628	4	29
		10			8 633	5	32			9 767	5	32			10 901	5	32			12 035	5	32
	700	4			3 727	2	23			4 216	2	23			4 706	2	24			5 196	2	24
		6	0.280	0.259	5 590	3	26	0.315	0.293	6 324	3	26	0.350	0.327	7 059	3	26	0.385	0.361	7 793	3	27
		8			7 453	4	29			8 433	4	29			9 412	4	29			10 391	4	30
		10			9 317	5	32			10 541	5	32			11 765	5	32			12 989	5	33

B_w – nominal width [mm]
H_w – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H _w [mm]																				
		400					450					500					550					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B _w [mm]	750	4			4 000	2	23			4 526	2	24			5 052	2	24			5 577	2	24
		6	0.300	0.278	6 000	3	26	0.338	0.314	6 789	3	26	0.375	0.351	7 577	3	27	0.413	0.387	8 366	3	27
		8			8 001	4	29			9 052	4	29			10 103	4	30			11 154	4	30
		10			10 001	5	32			11 315	5	32			12 629	5	33			13 943	5	33
	800	4			4 274	2	24			4 836	2	23			5 397	2	24			5 959	2	25
		6	0.320	0.297	6 411	3	26	0.360	0.336	7 253	3	26	0.400	0.375	8 096	3	27	0.440	0.414	8 938	3	27
		8			8 548	4	29			9 671	4	29			10 794	4	29			11 917	4	30
		10			10 685	5	33			12 089	5	32			13 493	5	32			14 897	5	33
	850	4			4 548	2	24			5 145	2	23			5 743	2	24			6 340	2	25
		6	0.340	0.316	6 821	3	26	0.383	0.357	7 718	3	26	0.425	0.399	8 614	3	26	0.468	0.440	9 510	3	27
		8			9 095	4	30			10 290	4	29			11 485	4	29			12 681	4	30
		10			11 369	5	33			12 863	5	32			14 357	5	32			15 851	4	33
	900	4			4 821	2	24			5 455	2	23			6 088	2	24			6 722	2	25
		6	0.360	0.335	7 232	3	27	0.405	0.379	8 182	3	26	0.450	0.423	9 132	3	26	0.495	0.467	10 083	3	27
		8			9 642	4	30			10 909	4	28			12 177	4	29			13 444	4	30
		10			12 053	5	33			13 637	5	31			15 221	5	32			16 805	4	33
	950	4			5 095	2	24			5 764	2	23			6 434	2	24			6 722	2	25
		6	0.380	0.354	7 642	3	27	0.428	0.400	8 646	3	25	0.475	0.447	9 651	3	26	0.523	0.493	10 083	3	28
		8			10 189	4	30			11 529	4	28			12 868	4	29			13 444	4	30
		10			12 737	5	33			14 411	5	31			16 085	5	32			16 805	4	33
	1000	4			3 727	2	24			4 216	2	23			4 706	2	24			5 196	2	25
		6	0.400	0.373	5 590	3	27	0.450	0.422	6 324	3	26	0.500	0.471	7 059	3	26	0.550	0.520	7 793	3	28
		8			7 453	4	30			8 433	4	29			9 412	4	29			10 391	4	31
		10			9 317	5	33			10 541	5	32			11 765	4	32			12 989	4	33
	1050	4			4 000	2	25			4 526	2	23			5 052	2	24			5 577	2	26
		6	0.420	0.392	6 000	3	27	0.473	0.443	6 789	3	26	0.525	0.495	7 577	3	26	0.578	0.546	8 366	3	28
		8			8 001	4	30			9 052	4	29			10 103	4	29			11 154	3	31
		10			10 001	5	33			11 315	5	32			12 629	4	32			13 943	4	33
	1100	4			4 274	2	25			4 836	2	23			5 397	2	24			5 959	2	26
		6	0.440	0.411	6 411	3	27	0.495	0.465	7 253	3	25	0.550	0.519	8 096	3	26	0.605	0.573	8 938	3	28
		8			8 548	4	30			9 671	4	28			10 794	4	29			11 917	3	31
		10			10 685	5	33			12 089	5	31			13 493	4	32			14 897	4	34
	1150	4			4 548	2	25			5 145	2	23			5 743	2	24			6 340	2	26
		6	0.460	0.430	6 821	3	28	0.518	0.486	7 718	3	25	0.575	0.543	8 614	3	26	0.633	0.599	9 510	3	28
		8			9 095	4	31			10 290	4	28			11 485	4	29			12 681	3	31
		10			11 369	5	34			12 863	5	31			14 357	4	32			15 851	4	34
	1200	4			4 821	2	25			5 455	2	23			6 088	2	24			6 722	2	26
		6	0.480	0.449	7 232	3	28	0.540	0.508	8 182	3	25	0.600	0.567	9 132	3	26	0.660	0.626	10 083	3	28
		8			9 642	4	31			10 909	4	28			12 177	4	29			13 444	3	31
		10			12 053	5	34			13 637	5	31			15 221	4	32			16 805	4	34
	1250	4			6 736	2	25			5 764	2	23			6 434	2	24			6 722	2	26
		6	0.500	0.468	10 104	3	28	0.563	0.529	8 646	3	25	0.625	0.591	9 651	3	26	0.688	0.652	10 083	3	29
		8			13 473	4	31			11 529	4	28			12 868	4	29			13 444	3	31
		10			16 841	5	34			14 411	4	31			16 085	4	32			16 805	4	34

B_w – nominal width [mm]
 H_w – nominal height [mm]

v – velocity [m/s]
 S_k – duct cross-section [m²]
 S_e – damper active cross-section [m²]

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

		height H_w [mm]																				
		600					650					700					750					
		v [m/s]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]
width B_w [mm]	400	4			3 180	3	22			3 453	2	23			3 727	2	23			4 000	2	23
		6	0.240	0.221	4 769	3	25	0.260	0.240	5 180	3	26	0.280	0.259	5 590	3	26	0.300	0.278	6 000	3	26
		8			6 359	4	29			6 906	4	29			7 453	4	29			8 001	4	29
		10			7 949	5	32			8 633	5	32			9 317	5	32			10 001	5	32
	450	4			3 597	2	23			3 907	2	23			4 216	2	23			4 526	2	24
		6	0.270	0.250	5 396	3	26	0.293	0.271	5 860	3	26	0.315	0.293	6 324	3	26	0.338	0.314	6 789	3	26
		8			7 194	4	29			7 813	4	29			8 433	4	29			9 052	4	29
		10			8 993	5	32			9 767	5	32			10 541	5	32			11 315	5	32
	500	4			4 015	2	23			4 360	2	23			4 706	2	24			5 052	2	24
		6	0.300	0.279	6 022	3	26	0.325	0.303	6 540	3	26	0.350	0.327	7 059	3	26	0.375	0.351	7 577	3	27
		8			8 029	4	29			8 721	4	29			9 412	4	29			10 103	4	30
		10			10 037	5	32			10 901	5	32			11 765	5	32			12 629	5	33
	550	4			4 850	2	24			5 268	2	24			5 196	2	24			5 577	2	24
		6	0.330	0.308	7 275	3	26	0.358	0.334	7 901	3	26	0.385	0.361	7 793	3	27	0.413	0.387	8 366	3	27
		8			9 700	4	29			10 535	4	29			10 391	4	30			11 154	4	30
		10			12 125	5	32			13 169	5	32			12 989	5	33			13 943	5	33
	600	4			4 850	2	24			5 268	2	24			5 685	2	24			6 103	2	25
		6	0.360	0.337	7 275	3	26	0.390	0.366	7 901	3	27	0.420	0.395	8 528	3	27	0.450	0.424	9 154	3	27
		8			9 700	4	29			10 535	4	30			11 370	4	30			12 205	4	30
		10			12 125	5	32			13 169	5	33			14 213	5	33			15 257	4	33
	650	4			5 268	2	24			5 721	2	24			6 175	2	25			6 628	2	25
		6	0.390	0.366	7 901	3	27	0.423	0.397	8 582	3	27	0.455	0.429	9 262	3	27	0.488	0.460	9 942	3	27
		8			10 535	4	30			11 442	4	30			12 349	4	30			13 257	4	30
		10			13 169	5	33			14 303	5	33			15 437	4	33			16 571	4	33
	700	4			5 685	2	24			6 175	2	25			6 664	2	25			7 154	2	25
		6	0.420	0.395	8 528	3	27	0.455	0.429	9 262	3	27	0.490	0.463	9 996	3	27	0.525	0.497	10 731	3	28
		8			11 370	4	30			12 349	4	30			13 329	4	30			14 308	3	30
		10			14 213	5	33			15 437	4	33			16 661	4	33			17 885	4	33

B_w – nominal width [mm]
H_w – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H _w [mm]																				
		600					650					700					750					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	L _{WA} [dB]
width B _w [mm]	750	4			6 103	2	25			6 628	2	25			7 154	2	25			7 680	2	25
		6	0,450	0,424	9 154	3	27	0,488	0,460	9 942	3	27	0,525	0,497	10 731	3	28	0,563	0,533	11 519	3	28
		8			12 205	4	30			13 257	4	30			14 308	3	30			15 359	3	30
		10			15 257	4	33			16 571	4	33			17 885	4	33			19 199	4	33
	800	4			6 520	2	25			7 082	2	25			7 644	2	23			8 205	2	26
		6	0,480	0,453	9 780	3	27	0,520	0,492	10 623	3	27	0,560	0,531	11 465	3	25	0,600	0,570	12 308	3	28
		8			13 041	4	30			14 164	3	30			15 287	3	28			16 410	3	31
		10			16 301	4	33			17 705	4	33			19 109	4	30			20 513	4	33
	850	4			6 938	2	25			7 536	2	25			8 133	2	26			8 731	2	26
		6	0,510	0,482	10 407	3	27	0,553	0,523	11 303	3	27	0,595	0,565	12 200	3	28	0,638	0,606	13 096	3	28
		8			13 876	4	30			15 071	3	30			16 266	3	31			17 461	3	31
		10			17 345	4	33			18 839	4	33			20 333	4	33			21 827	4	33
	900	4			7 356	2	25			7 989	2	25			8 623	2	26			9 256	2	26
		6	0,540	0,511	11 033	3	25	0,585	0,555	11 984	3	27	0,630	0,599	12 934	3	28	0,675	0,643	13 884	3	28
		8			14 711	3	28			15 978	3	30			17 245	3	31			18 513	3	31
		10			18 389	4	30			19 973	4	32			21 557	4	33			23 141	4	34
	950	4			7 773	2	26			8 443	2	25			9 112	2	26			9 782	2	26
		6	0,570	0,540	11 660	3	28	0,618	0,586	12 664	3	27	0,665	0,633	13 668	3	28	0,713	0,679	14 673	3	29
		8			15 546	3	31			16 885	3	30			18 225	3	31			19 564	3	31
		10			19 433	4	33			21 107	4	32			22 781	4	34			24 455	4	34
	1000	4			5 685	2	24			6 175	2	24			6 664	2	25			7 154	2	27
		6	0,600	0,569	8 528	3	26	0,650	0,618	9 262	3	27	0,700	0,667	9 996	3	27	0,750	0,716	10 731	3	29
		8			11 370	3	29			12 349	3	29			13 329	3	29			14 308	3	31
		10			14 213	4	32			15 437	4	32			16 661	4	32			17 885	4	34
	1050	4			6 103	2	24			6 628	2	25			7 154	2	25			7 680	2	27
		6	0,630	0,598	9 154	3	27	0,683	0,649	9 942	3	27	0,735	0,701	10 731	3	27	0,788	0,752	11 519	3	29
		8			12 205	3	29			13 257	3	29			14 308	3	30			15 359	3	31
		10			15 257	4	32			16 571	4	32			17 885	4	32			19 199	4	34
	1100	4			6 520	2	25			7 082	2	25			7 644	2	23			8 205	2	27
		6	0,660	0,627	9 780	3	27	0,715	0,681	10 623	3	27	0,770	0,735	11 465	3	25	0,825	0,789	12 308	3	29
		8			13 041	3	30			14 164	3	29			15 287	3	27			16 410	3	31
		10			16 301	4	32			17 705	4	32			19 109	4	29			20 513	4	34
	1150	4			6 938	2	25			7 536	2	25			8 133	2	26			8 731	2	26
		6	0,690	0,656	10 407	3	27	0,748	0,712	11 303	3	27	0,805	0,769	12 200	3	28	0,863	0,825	13 096	3	28
		8			13 876	3	30			15 071	3	29			16 266	3	30			17 461	3	30
		10			17 345	4	32			18 839	4	32			20 333	4	33			21 827	4	33
	1200	4			7 356	2	25			7 989	2	25			8 623	2	26			9 256	2	26
		6	0,720	0,685	11 033	3	25	0,780	0,744	11 984	3	27	0,840	0,803	12 934	3	28	0,900	0,862	13 884	3	28
		8			14 711	3	28			15 978	3	29			17 245	3	30			18 513	3	30
		10			18 389	4	30			19 973	4	32			21 557	4	33			23 141	4	33
	1250	4			7 773	2	25			8 443	2	25			9 112	2	26			9 782	2	26
		6	0,750	0,714	11 660	3	28	0,813	0,775	12 664	3	27	0,875	0,837	13 668	3	28	0,938	0,898	14 673	3	28
		8			15 546	3	30			16 885	3	29			18 225	3	30			19 564	3	31
		10			19 433	4	33			21 107	4	32			22 781	4	33			24 455	4	33

B_w – nominal width [mm]
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v – velocity [m/s]
 S_k – duct cross-section [m²]
 S_e – damper active cross-section [m²]

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 d_p – pressure drop [Pa]
 L_{WA} – damper noise level [dB]

		height H_w [mm]																				
		800					850					900					950					
		v [m/s]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]
width B_w [mm]	400	4			20 212	2	24			22 203	2	24			24 196	2	24			26 191	2	24
		6	0,320	0,297	24 551	3	26	0,340	0,316	26 483	3	26	0,360	0,335	28 475	3	27	0,380	0,354	30 508	3	27
		8			28 983	4	29			30 942	4	30			33 000	4	30			35 123	4	30
		10			33 167	5	33			35 213	5	33			37 382	5	33			39 632	5	33
	450	4			23 382	2	24			25 657	2	24			27 936	2	24			30 218	2	25
		6	0,360	0,336	28 206	3	27	0,383	0,357	30 394	3	27	0,405	0,379	32 655	3	27	0,428	0,400	34 964	3	27
		8			33 156	4	30			35 357	4	30			37 676	4	30			40 072	4	30
		10			37 845	5	33			40 131	5	33			42 562	5	33			45 088	5	33
	500	4			26 621	2	24			29 184	2	24			31 752	2	25			34 326	2	25
		6	0,400	0,375	31 927	3	27	0,425	0,399	34 375	3	27	0,450	0,423	36 908	3	27	0,475	0,447	39 496	3	27
		8			37 394	4	30			39 840	4	30			42 421	4	30			45 092	4	30
		10			42 586	5	33			45 114	5	33			47 807	5	33			50 612	5	33
	550	4			29 922	2	25			32 776	2	25			35 638	2	25			38 508	2	25
		6	0,440	0,414	35 708	3	27	0,468	0,440	38 420	3	27	0,495	0,467	41 228	3	27	0,523	0,493	44 099	3	28
		8			41 689	4	30			44 383	4	30			47 230	4	30			50 179	4	30
		10			47 384	5	33			50 155	4	33			53 114	4	33			56 198	4	33
	600	4			33 279	2	25			36 428	2	25			39 588	2	25			42 756	2	26
		6	0,480	0,453	39 545	3	27	0,510	0,482	42 522	3	27	0,540	0,511	45 609	3	28	0,570	0,540	48 766	3	28
		8			46 039	4	30			48 982	4	30			52 098	3	30			55 328	3	31
		10			52 234	4	33			55 251	4	33			58 477	4	33			61 844	4	33
	650	4			34 338	2	25			35 303	2	25			36 170	2	25			36 951	2	25
		6	0,520	0,492	40 650	3	27	0,553	0,523	41 059	3	27	0,585	0,555	41 522	3	27	0,618	0,586	41 997	3	27
		8			47 208	3	30			47 177	3	30			47 308	3	30			47 524	3	30
		10			53 474	4	33			53 126	4	33			53 010	4	32			53 028	4	32
	700	4			37 574	2	25			38 609	2	26			39 539	2	26			40 379	2	26
		6	0,560	0,531	44 332	3	28	0,595	0,565	44 758	3	28	0,630	0,599	45 246	3	28	0,665	0,633	45 750	3	28
		8			51 368	3	30			51 311	3	31			51 433	3	31			51 652	3	31
		10			58 102	4	33			57 694	4	33			57 544	4	33			57 543	4	34

B_w – nominal width [mm]
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v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H _w [mm]																				
		800					850					900					950					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B _w [mm]	750	4			40 850	2	26			41 955	2	26			42 949	2	26			43 848	2	26
		6	0.600	0.570	48 055	3	28	0.638	0.606	48 498	3	28	0.675	0.643	49 011	3	28	0.713	0.679	49 544	3	29
		8			55 568	3	31			55 484	3	31			55 598	3	31			55 818	3	31
		10			62 769	4	33			62 301	4	33			62 116	4	34			62 096	4	34
	800	4			44 166	2	26			45 340	2	26			46 398	2	26			47 355	2	27
		6	0.640	0.609	51 816	3	28	0.680	0.648	52 275	3	28	0.720	0.687	52 813	3	29	0.760	0.726	53 375	3	29
		8			59 806	3	31			59 695	3	31			59 800	3	31			60 022	3	31
		10			67 474	4	33			66 945	4	34			66 724	4	34			66 684	4	34
	850	4			47 517	2	26			48 761	2	26			49 883	2	26			50 898	2	26
		6	0.680	0.648	55 612	3	28	0.723	0.689	56 088	3	28	0.765	0.731	56 651	3	28	0.808	0.772	57 242	3	28
		8			64 080	3	31			63 940	3	30			64 036	3	30			64 260	3	30
		10			72 213	4	33			71 624	4	33			71 367	4	33			71 306	4	33
	900	4			50 903	2	26			52 217	2	26			53 402	2	26			54 476	2	26
		6	0.720	0.687	59 443	3	28	0.765	0.731	59 935	3	28	0.810	0.775	60 523	3	28	0.855	0.819	61 142	3	28
		8			68 387	3	31			68 219	3	31			68 306	3	31			68 531	3	30
		10			76 986	4	33			76 335	4	33			76 042	4	33			75 960	4	33
	950	4			54 320	2	26			55 704	2	26			56 953	2	26			58 085	2	26
		6	0.760	0.726	63 305	3	28	0.808	0.772	63 814	3	28	0.855	0.819	64 426	3	28	0.903	0.865	65 073	3	28
		8			72 725	3	31			72 529	3	31			72 606	3	31			72 832	3	31
		10			81 789	4	33			81 076	4	33			80 747	4	33			80 645	4	33
	1000	4			40 094	2	27			41 103	2	27			42 014	2	27			42 840	2	27
		6	0.800	0.765	46 638	3	29	0.850	0.814	47 003	3	29	0.900	0.863	47 445	3	29	0.950	0.912	47 914	3	29
		8			53 506	3	31			53 351	3	31			53 397	3	32			53 555	3	32
		10			60 120	4	34			59 582	4	34			59 328	4	34			59 243	4	34
	1050	4			43 417	2	27			44 496	2	27			45 472	2	27			46 357	2	28
		6	0.840	0.804	50 415	3	29	0.893	0.855	50 799	3	29	0.945	0.907	51 268	3	29	0.998	0.958	51 767	3	30
		8			57 768	3	31			57 588	3	32			57 629	3	32			57 791	3	32
		10			64 853	4	34			64 259	4	34			63 973	4	34			63 871	4	34
	1100	4			46 773	2	27			47 923	2	27			48 964	2	28			49 908	2	28
		6	0.880	0.843	54 226	3	29	0.935	0.897	54 628	3	29	0.990	0.951	55 124	3	30	1.045	1.005	55 653	3	30
		8			62 061	3	32			61 857	3	32			61 892	3	32			62 057	3	32
		10			69 616	4	34			68 966	4	34			68 648	4	34			68 528	4	34
	1150	4			50 162	2	26			51 383	2	26			52 488	2	26			53 491	2	26
		6	0.920	0.882	58 067	3	28	0.978	0.938	58 488	3	28	1.035	0.995	59 010	3	28	1.093	1.051	59 569	3	28
		8			66 385	3	30			66 157	3	30			66 184	3	30			66 353	3	30
		10			74 410	4	33			73 703	4	32			73 351	4	32			73 214	4	32
	1200	4			53 582	2	26			54 874	2	26			56 043	2	26			57 104	2	26
		6	0.960	0.921	61 939	3	28	1.020	0.980	62 378	3	28	1.080	1.039	62 926	3	28	1.140	1.098	63 514	3	28
		8			70 738	3	30			70 485	3	30			70 505	3	30			70 676	3	30
		10			79 232	4	33			78 467	4	33			78 083	4	33			77 926	4	32
	1250	4			57 031	2	26			58 393	2	26			59 627	2	26			60 747	2	26
		6	1.000	0.960	65 839	3	28	1.063	1.021	66 296	3	28	1.125	1.083	66 871	3	28	1.188	1.144	67 488	3	28
		8			75 119	3	30			74 840	3	30			74 853	3	30			75 027	3	30
		10			84 082	4	33			83 258	4	33			82 840	4	33			82 665	4	33

B_w – nominal width [mm]
 H_w – nominal height [mm]

v – velocity [m/s]
 S_k – duct cross-section [m²]
 S_e – damper active cross-section [m²]

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

		height H_w [mm]																				
		1000					1050					1100					1150					
		v [m/s]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]
width B_w [mm]	400	4			28 190	2	24			30 194	2	25			32 203	2	25			34 220	2	25
		6	0.400	0.373	32 569	3	27	0.420	0.392	34 653	3	27	0.440	0.411	36 756	3	27	0.460	0.430	38 876	3	28
		8			37 293	4	30			39 498	4	30			41 732	4	30			43 989	4	31
		10			41 939	5	33			44 291	5	33			46 677	5	33			49 092	5	34
	450	4			32 506	2	25			34 799	2	25			37 100	2	25			39 409	2	25
		6	0.450	0.422	37 307	3	27	0.473	0.443	39 677	3	27	0.495	0.465	42 069	3	28	0.518	0.486	44 481	3	28
		8			42 523	4	30			45 015	4	30			47 542	4	31			50 097	4	31
		10			47 682	5	33			50 329	5	33			53 016	5	33			55 738	5	34
	500	4			36 907	2	25			39 495	2	25			42 091	2	25			44 697	2	26
		6	0.500	0.471	42 125	3	28	0.525	0.495	44 785	3	28	0.550	0.519	47 470	3	28	0.575	0.543	50 179	3	28
		8			47 827	4	30			50 611	4	31			53 433	4	31			56 288	4	31
		10			53 495	4	33			56 438	4	33			59 429	4	34			62 459	4	34
550	4			41 385	2	25			44 271	2	26			47 167	2	26			50 074	2	26	
	6	0.550	0.520	47 016	3	28	0.578	0.546	49 969	3	28	0.605	0.573	52 952	3	28	0.633	0.599	55 960	3	28	
	8			53 201	4	31			56 278	3	31			59 399	3	31			62 556	3	31	
	10			59 372	4	33			62 615	4	33			65 911	4	34			69 251	4	34	
600	4			45 934	2	26			49 122	2	26			52 321	2	26			55 531	2	26	
	6	0.600	0.569	51 976	3	28	0.630	0.598	55 225	3	28	0.660	0.627	58 507	3	28	0.690	0.656	61 818	3	29	
	8			58 639	3	31			62 011	3	31			65 434	3	31			68 897	3	31	
	10			65 311	4	33			68 854	4	34			72 458	4	34			76 111	4	34	
650	4			37 661	2	25			38 310	2	25			38 907	2	25			39 460	2	25	
	6	0.650	0.618	42 466	3	27	0.683	0.649	42 922	3	27	0.715	0.681	43 360	3	27	0.748	0.712	43 779	3	27	
	8			47 785	3	30			48 070	3	29			48 365	3	29			48 663	3	29	
	10			53 128	4	32			53 277	4	32			53 458	4	32			53 658	4	32	
700	4			41 142	2	26			41 840	2	26			42 483	2	27			43 078	2	27	
	6	0.700	0.667	46 250	3	28	0.735	0.701	46 736	3	29	0.770	0.735	47 204	3	29	0.805	0.769	47 652	3	29	
	8			51 922	3	31			52 219	3	31			52 529	3	31			52 843	3	31	
	10			57 633	4	34			57 780	4	34			57 963	4	34			58 169	4	34	

B_w – nominal width [mm]
H_w – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H _w [mm]																				
		1000					1050					1100					1150					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B _w [mm]	750	4			44 664	2	27			45 412	2	27			46 100	2	27			46 738	2	27
		6	0.750	0.716	50 074	3	29	0.788	0.752	50 590	3	29	0.825	0.789	51 088	3	29	0.863	0.825	51 566	3	29
		8			56 097	3	31			56 406	3	31			56 731	3	31			57 062	3	32
		10			62 176	4	34			62 321	4	34			62 505	4	34			62 716	4	34
	800	4			48 225	2	27			47 122	2	27			49 166	2	27			50 435	2	27
		6	0.800	0.765	53 935	3	29	0.840	0.804	52 581	3	29	0.880	0.843	54 419	3	29	0.920	0.882	55 516	3	29
		8			60 308	3	31			58 730	3	31			60 380	3	32			61 316	3	32
		10			66 755	4	34			64 996	4	34			66 493	4	34			67 298	4	34
	850	4			51 822	2	26			50 058	2	26			52 232	2	26			54 169	2	26
		6	0.850	0.814	57 832	3	28	0.893	0.855	55 798	3	28	0.935	0.897	57 750	3	28	0.978	0.938	59 502	3	28
		8			64 554	3	30			62 278	3	30			64 026	3	30			65 605	3	30
		10			71 367	4	33			68 894	4	33			70 476	4	33			71 912	4	32
	900	4			55 453	2	26			52 993	2	26			55 296	2	26			57 937	2	26
		6	0.900	0.863	61 761	3	28	0.945	0.907	59 014	3	28	0.990	0.951	61 079	3	28	1.035	0.995	63 520	3	28
		8			68 833	3	30			65 823	3	30			67 670	3	30			69 925	3	30
		10			76 010	4	33			72 790	4	33			74 457	4	33			76 558	4	33
	950	4			59 116	2	26			55 929	2	26			58 361	2	26			61 737	2	26
		6	0.950	0.912	65 723	3	28	0.998	0.958	62 228	3	28	1.045	1.005	64 407	3	28	1.093	1.051	67 571	3	28
		8			73 142	3	30			69 368	3	30			71 312	3	30			74 276	3	30
		10			80 684	4	33			76 683	4	33			78 435	4	33			81 233	4	33
	1000	4			43 592	2	28			41 446	2	28			42 082	2	28			45 507	2	28
		6	1.000	0.961	48 385	3	30	1.050	1.010	46 012	3	30	1.100	1.059	46 461	3	30	1.150	1.108	49 729	3	30
		8			53 775	3	32			51 196	3	32			51 471	3	32			54 591	3	32
		10			59 263	4	34			56 515	4	34			56 647	4	35			59 644	4	35
	1050	4			47 163	2	28			45 035	2	28			45 716	2	28			49 215	2	28
		6	1.050	1.010	52 270	3	30	1.103	1.061	49 896	3	30	1.155	1.113	50 375	3	30	1.208	1.164	53 705	3	30
		8			58 021	3	32			55 423	3	32			55 714	3	32			58 883	3	32
		10			63 883	4	34			61 102	4	35			61 237	4	35			64 273	4	35
	1100	4			50 768	2	28			46 760	2	28			48 798	2	28			52 958	2	29
		6	1.100	1.059	56 186	3	30	1.155	1.113	51 915	3	30	1.210	1.167	53 735	3	30	1.265	1.221	57 713	3	30
		8			62 297	3	32			57 783	3	32			59 400	3	32			63 205	3	33
		10			68 533	4	35			63 821	4	35			65 270	4	35			68 930	4	35
	1150	4			54 405	2	26			49 711	2	26			51 878	2	26			56 733	2	25
		6	1.150	1.108	60 133	3	27	1.208	1.164	55 157	3	27	1.265	1.221	57 091	3	27	1.323	1.277	61 751	3	27
		8			66 602	3	30			61 366	3	30			63 082	3	30			67 556	3	29
		10			73 210	4	32			67 761	4	32			69 296	4	32			73 614	4	32
	1200	4			58 072	2	26			52 660	2	26			54 957	2	26			60 538	2	26
		6	1.200	1.157	64 110	3	28	1.260	1.216	58 396	3	28	1.320	1.275	60 445	3	28	1.380	1.334	65 818	3	28
		8			70 935	3	30			64 944	3	30			66 759	3	30			71 934	3	30
		10			77 914	4	32			71 695	4	32			73 317	4	32			78 324	4	32
	1250	4			61 769	2	26			55 607	2	26			58 034	2	26			64 371	2	26
		6	1.250	1.206	68 114	3	28	1.313	1.267	61 633	3	28	1.375	1.329	63 796	3	28	1.438	1.390	69 912	3	28
		8			75 295	3	30			68 518	3	30			70 433	3	30			76 338	3	30
		10			82 644	4	32			75 625	4	32			77 332	4	32			83 059	4	32

B_w – nominal width [mm]
 H_w – nominal height [mm]

v – velocity [m/s]
 S_k – duct cross-section [m²]
 S_e – damper active cross-section [m²]

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

		height H_w [mm]										
		1200					1250					
		v [m/s]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]	S_k [m ²]	S_e [m ²]	Q [m ³ /s]	d_p [Pa]	L_{WA} [dB]
width B_w [mm]	400	4			36 243	2	25			38 275	2	25
		6	0.480	0.449	41 010	3	28	0.500	0.468	43 158	3	28
		8			46 268	4	31			48 564	4	31
		10			51 532	5	34			53 993	5	34
	450	4			41 727	2	25			44 053	2	26
		6	0.540	0.508	46 911	3	28	0.563	0.529	49 356	3	28
		8			52 675	4	31			55 275	4	31
		10			58 488	5	34			61 263	4	34
	500	4			47 312	2	26			49 938	2	26
		6	0.600	0.567	52 907	3	28	0.625	0.591	55 653	3	28
		8			59 170	4	31			62 077	4	31
		10			65 522	4	34			68 613	4	34
	550	4			52 991	2	26			55 920	2	26
		6	0.660	0.626	58 990	3	28	0.688	0.652	62 040	3	29
		8			65 745	3	31			68 961	3	31
		10			72 629	4	34			76 039	4	34
	600	4			58 754	2	26			61 989	2	27
		6	0.720	0.685	65 153	3	29	0.750	0.714	68 511	3	29
		8			72 395	3	31			75 923	3	31
		10			79 806	4	34			83 537	4	34
	650	4			39 974	2	25			40 455	2	25
		6	0.780	0.744	44 180	3	27	0.813	0.775	44 563	3	27
		8			48 960	3	29			49 253	3	29
		10			53 869	4	32			54 088	4	32
	700	4			43 632	2	27			44 150	2	27
		6	0.840	0.803	48 082	3	29	0.875	0.837	48 492	3	29
		8			53 157	3	32			53 468	3	32
		10			58 388	4	34			58 616	4	34

B_w – nominal width [mm]
H_w – nominal height [mm]

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H _w [mm]										
		1200					1250					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B _w [mm]	750	4			47 331	2	27			47 886	2	27
		6	0.900	0.862	52 023	3	29	0.938	0.898	52 461	3	29
		8			57 393	3	32			57 721	3	32
		10			62 943	4	34			63 179	4	34
	800	4			51 068	2	28			51 070	2	28
		6	0.960	0.921	56 002	3	30	1.000	0.960	55 878	3	30
		8			61 665	3	32			61 421	3	32
		10			67 532	4	34			67 188	4	34
	850	4			54 841	2	26			54 254	2	26
		6	1.020	0.980	60 016	3	28	1.063	1.021	59 292	3	28
		8			65 970	3	30			65 117	3	30
		10			72 153	4	32			71 191	4	32
	900	4			58 649	2	26			57 438	2	26
		6	1.080	1.039	58 606	3	28	1.125	1.083	62 706	3	28
		8			64 851	3	30			68 811	3	30
		10			69 972	4	33			75 192	4	32
	950	4			62 488	2	26			60 621	2	26
		6	1.140	1.098	68 141	3	28	1.188	1.144	66 118	3	28
		8			74 675	3	30			72 503	3	30
		10			81 487	4	33			79 189	4	33
	1000	4			43 219	2	28			43 732	2	29
		6	1.200	1.157	47 308	3	30	1.250	1.206	47 707	3	30
		8			52 043	3	32			52 331	3	33
		10			56 989	4	35			57 183	4	35
	1050	4			46 936	2	29			47 486	2	29
		6	1.260	1.216	51 281	3	30	1.313	1.267	51 707	3	31
		8			56 322	3	33			56 628	3	33
		10			61 594	4	35			61 798	4	35
	1100	4			50 689	2	29			50 687	2	29
		6	1.320	1.275	55 289	3	31	1.375	1.329	55 153	3	31
		8			60 633	3	33			60 367	3	33
		10			66 231	4	35			65 854	4	35
	1150	4			54 478	2	25			53 886	2	25
		6	1.380	1.334	59 330	3	27	1.438	1.390	58 595	3	27
		8			64 975	3	29			64 102	3	29
		10			70 897	4	32			69 904	4	32
	1200	4			58 299	2	26			57 084	2	26
		6	1.440	1.393	57 945	3	27	1.500	1.452	62 034	3	27
		8			63 891	3	30			67 831	3	30
		10			68 758	4	32			73 947	4	32
	1250	4			62 151	2	26			60 280	2	26
		6	1.500	1.452	67 503	3	28	1.563	1.513	65 471	3	28
		8			73 747	3	30			71 556	3	30
		10			80 312	4	32			77 984	4	32

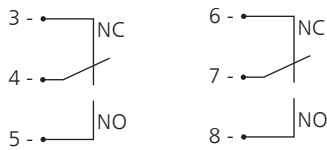
16.7 | Trigger control mechanisms – specifications and connections diagram

execution type	EM24D + WK2
limit switch	250 V AC / 5A
rated voltage	24 V DC / pulse
power consumption	max 5 W

» electrical connections diagram for mcr DOR EM24D + WK2 damper

1 - „+“

2 - „-“



NOTE: the position of limit switches in standby

If the MP 230/24 element is used, the damper may be controlled (supplied) with 230 V AC voltage.

16.8 | Estimated weight of the mcr DOR rectangular dampers

		Width B [mm]															
		500	550	600	650	700	750	800	850	900	950	1 000	1050	1 100	1150	1 200	1250
Height H [mm]	400	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	17
	450	9	10	10	11	12	12	13	14	14	15	16	16	17	18	18	19
	500	10	10	11	12	12	13	14	15	15	16	17	18	18	19	20	21
	550	10	11	12	13	13	14	15	16	17	17	18	19	20	21	21	22
	600	11	12	13	14	14	15	16	17	18	19	19	20	21	22	23	24
	650	12	13	14	14	15	16	17	18	19	20	21	22	23	23	24	25
	700	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	750	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	800	14	15	16	17	18	19	20	21	22	24	25	26	27	28	29	30
	850	15	16	17	18	19	20	21	23	24	25	26	27	28	29	30	31
	900	15	17	18	19	20	21	22	24	25	26	27	28	29	31	32	33
	950	16	17	19	20	21	22	24	25	26	27	28	30	31	32	33	35
	1000	17	18	19	21	22	23	25	26	27	28	30	31	32	34	35	36
	1050	18	19	20	22	23	24	26	27	28	30	31	32	34	35	36	38
	1100	18	20	21	23	24	25	27	28	29	31	32	34	35	36	38	39
1150	19	21	22	23	25	26	28	29	31	32	34	35	36	38	39	41	
1200	20	21	23	24	26	27	29	30	32	33	35	36	38	39	41	42	
1250	21	22	24	25	27	28	30	31	33	35	36	38	39	41	42	44	

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

v – velocity [m/s]
S_e – grille active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

		height H [mm]												
		600				700			800			900		
		v [m/s]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	S _e [m ²]	Q [m ³ /s]	d _p [PA]
width B [mm]	200	4		982	8		1 175	8		1 368	8		1 558	8
		6	0.068	1 473	19	0.082	1 763	18	0.095	2 052	18	0.108	2 337	17
		8		1 964	33		2 350	32		2 736	31		3 116	31
		10		2 455	52		2 938	50		3 420	49		3 895	48
	300	4		1 732	6	0.143	2 065	6	0.167	2 398	6	0.189	2 726	6
		6	0.120	2 598	14		3 097	14		3 596	13		4 089	13
		8		3 465	25		4 130	24		4 795	24		5 452	23
		10		4 331	40		5 162	38		5 994	37		6 815	36
	400	4		2 483	5	0.205	2 955	5	0.238	3 427	5	0.270	3 894	5
		6	0.172	3 724	12		4 432	12		5 141	11		5 841	11
		8		4 965	22		5 910	21		6 854	20		7 788	19
		10		6 206	34		7 387	32		8 568	31		9 734	30
	500	4		3 233	5	0.267	3 845	5	0.310	4 457	4	0.352	5 062	4
		6	0.225	4 849	11		5 767	10		6 685	10		7 592	9
		8		6 466	19		7 690	18		8 914	17		10 123	17
		10		8 082	30		9 612	28		11 142	27		12 654	26
	600	4		3 983	4	0.329	4 735	4	0.381	5 486	4	0.433	6 229	4
		6	0.277	5 975	10		7 102	9		8 230	9		9 344	9
		8		7 966	18		9 469	17		10 973	16		12 459	15
		10		9 958	28		11 837	26		13 716	25		15 574	24
	700	4		4 733	4	0.391	5 625	4	0.453	6 516	4	0.514	7 397	4
		6	0.329	7 100	9		8 437	9		9 774	8		11 096	8
		8		9 467	17		11 249	16		13 032	15		14 795	14
		10		11 833	26		14 062	24		16 290	23		18 493	22
	800	4		5 484	4	0.452	6 515	4	0.524	7 546	3	0.595	8 565	3
		6	0.381	8 225	9		9 772	8		11 318	8		12 848	8
		8		10 967	16		13 029	15		15 091	14		17 130	13
		10		13 709	25		16 286	23		18 864	22		21 413	21
	900	4		6 234	4	0.514	7 404	4	0.596	8 575	3	0.676	9 733	3
		6	0.433	9 351	9		11 107	8		12 863	7		14 599	7
		8		12 468	15		14 809	14		17 150	13		19 466	13
		10		15 584	24		18 511	22		21 438	21		24 332	20
	1000	4		6 984	4	0.576	8 294	3	0.667	9 605	3	0.757	10 901	3
		6	0.485	10 476	8		12 442	8		14 407	7		16 351	7
		8		13 968	15		16 589	14		19 210	13		21 802	12
		10		17 460	23		20 736	21		24 012	20		27 252	19
	1100	4		7 734	4	0.638	9 184	3	0.739	10 634	3	0.838	12 069	3
		6	0.537	11 601	8		13 776	7		15 952	7		18 103	7
		8		15 468	14		18 369	13		21 269	12		24 137	12
		10		19 336	22		22 961	21		26 586	19		30 172	18
	1200	4		8 484	3	0.700	10 074	3	0.810	11 664	3	0.919	13 236	3
		6	0.589	12 727	8		15 111	7		17 496	7		19 855	6
		8		16 969	14		20 148	13		23 328	12		26 473	11
		10		21 211	22		25 186	20		29 160	19		33 091	18
1300	4		9 235	3	0.761	10 964	3	0.882	12 694	3	1.000	14 404	3	
	6	0.641	13 852	8		16 446	7		19 040	7		21 606	6	
	8		18 469	14		21 928	13		25 387	12		28 809	11	
	10		23 087	21		27 410	20		31 734	18		36 011	17	
1400	4		9 985	3	0.823	11 854	3	0.953	13 723	3	1.081	15 572	3	
	6	0.693	14 977	8		17 781	7		20 585	6		23 358	6	
	8		19 970	13		23 708	12		27 446	11		31 144	11	
	10		24 962	21		29 635	19		34 308	18		38 930	17	

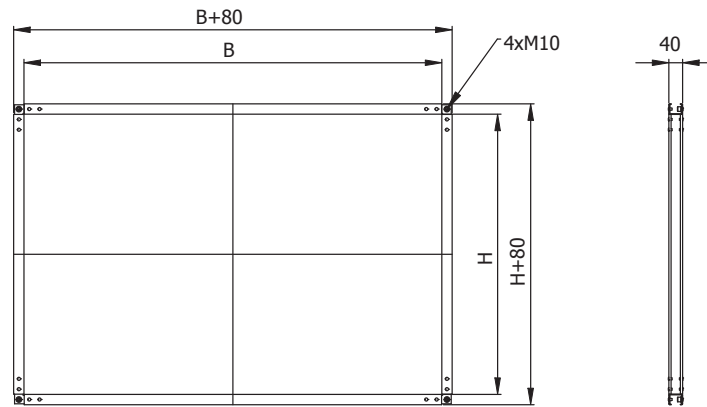
B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
S_e – grille active cross-section [m²]

Q – flow [m³/h]
d_p – pressure drop [Pa]

		height H [mm]															
		1000			1100			1200			1300			1400			
		v [m/s]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	S _e [m ²]	Q [m ³ /s]	d _p [PA]	S _e [m ²]	Q [m ³ /s]	d _p [PA]
width B [mm]	200	4		1 751	8		1 944	7		2 137	7		2 330	7		2 523	7
		6	0.122	2 627	17	0.135	2 916	17	0.148	3 205	16	0.162	3 495	16	0.175	3 784	16
		8		3 502	30		3 888	30		4 274	29		4 660	29		5 046	29
		10		4 378	47		4 860	46		5 342	46		5 825	45		6 307	45
	4	0.212		3 059	6		0.236	3 391		5	0.259		3 724	5		0.282	4 056
	6		4 588	13	5 087	12		5 586	12	6 085		12	6 584	12			
	8		6 117	22	6 782	22		7 448	22	8 113		21	8 778	21			
	10		7 646	35	8 478	34		9 310	34	10 141		33	10 973	33			
	400	4	0.303	4 366	5	0.336	4 838	5	0.369	5 311	4	0.402	5 783	4	0.434	6 255	4
		6		6 549	10		7 258	10		7 966	10		8 675	10		9 383	10
		8		8 732	19		9 677	18		10 621	18		11 566	17		12 511	17
		10		10 915	29		12 096	28		13 277	28		14 458	27		15 638	27
	500	4	0.394	5 674	4	0.437	6 286	4	0.479	6 898	4	0.522	7 510	4	0.564	8 122	4
		6		8 510	9		9 428	9		10 346	9		11 264	9		12 182	8
		8		11 347	16		12 571	16		13 795	15		15 019	15		16 243	15
		10		14 184	25		15 714	25		17 244	24		18 774	24		20 304	23
	600	4	0.485	6 981	4	0.537	7 733	4	0.589	8 484	3	0.641	9 236	3	0.694	9 988	3
		6		10 472	8		11 599	8		12 727	8		13 854	8		14 982	8
		8		13 962	15		15 466	14		16 969	14		18 472	14		19 976	13
		10		17 453	23		19 332	22		21 211	22		23 090	21		24 970	21
	700	4	0.576	8 289	3	0.638	9 180	3	0.699	10 071	3	0.761	10 963	3	0.823	11 854	3
		6		12 433	8		13 770	7		15 107	7		16 444	7		17 781	7
		8		16 577	14		18 360	13		20 143	13		21 925	13		23 708	12
		10		20 722	21		22 950	21		25 178	20		27 407	20		29 635	19
	800	4	0.666	9 596	3	0.738	10 627	3	0.810	11 658	3	0.881	12 689	3	0.953	13 720	3
		6		14 394	7		15 941	7		17 487	7		19 034	7		20 580	6
		8		19 192	13		21 254	12		23 316	12		25 379	12		27 441	11
		10		23 990	20		26 568	19		29 146	19		31 723	18		34 301	18
	900	4	0.757	10 904	3	0.839	12 074	3	0.920	13 245	3	1.001	14 416	3	1.082	15 587	3
		6		16 356	7		18 112	7		19 868	6		21 624	6		23 380	6
		8		21 807	12		24 149	12		26 490	11		28 832	11		31 173	11
		10		27 259	19		30 186	18		33 113	18		36 040	17		38 966	17
	1000	4	0.848	12 211	3	0.939	13 522	3	1.030	14 832	3	1.121	16 142	3	1.212	17 453	3
		6		18 317	7		20 282	6		22 248	6		24 214	6		26 179	6
		8		24 422	12		27 043	11		29 664	11		32 285	11		34 906	10
		10		30 528	18		33 804	18		37 080	17		40 356	17		43 632	16
	1100	4	0.939	13 519	3	1.040	14 969	3	1.140	16 419	3	1.241	17 869	3	1.342	19 319	2
		6		20 278	6		22 453	6		24 628	6		26 803	6		28 979	6
		8		27 037	11		29 938	11		32 838	10		35 738	10		38 638	10
		10		33 797	18		37 422	17		41 047	16		44 672	16		48 298	15
1200	4	1.030	14 826	3	1.140	16 416	3	1.250	18 006	3	1.361	19 596	2	1.471	21 185	2	
	6		22 239	6		24 624	6		27 009	6		29 393	6		31 778	5	
	8		29 652	11		32 832	10		36 012	10		39 191	10		42 371	10	
	10		37 066	17		41 040	16		45 014	16		48 989	15		52 963	15	
1300	4	1.120	16 134	3	1.241	17 863	3	1.361	19 593	2	1.481	21 322	2	1.601	23 052	2	
	6		24 201	6		26 795	6		29 389	6		31 983	5		34 577	5	
	8		32 268	11		35 726	10		39 185	10		42 644	10		46 103	9	
	10		40 334	17		44 658	16		48 982	15		53 305	15		57 629	14	
1400	4	1.211	17 441	3	1.341	19 310	2	1.471	21 180	2	1.601	23 049	2	1.730	24 918	2	
	6		26 162	6		28 966	6		31 769	5		34 573	5		37 377	5	
	8		34 883	10		38 621	10		42 359	10		46 097	9		49 836	9	
	10		43 603	16		48 276	16		52 949	15		57 622	14		62 294	14	

16.93 | RB connecting subframe



mcr RB connection frames are used to connect a steel ventilation duct to the damper. The connection may be made using bolts in the corners of the frame, as well as using latches/hasps for ventilation ducts or self-drilling screws.

Dimensions:

- » nominal width B: from 200 to 1200 mm
- » nominal height H from 200 mm to 800 mm
- » nominal thickness G 40 mm

Apart from the standard dimensions, masking elements may be manufactured with intermediate dimensions.

Marking:

mcr RB / B x H / 1 / 2 / 3



16.10 | Marking

mcr DOR / B x H / 1 / 2 / 3



1 – control:

- » trigger control mechanism
- EM 24 D – electromagnetically powered and tripped trigger and control mechanism

2 – material

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

3 – additional accessories

- MP230/24 – 230 V to 24 V transformation module
- WK2 - limit switch (closed blade signal)

NOTE: separate additional parameters entered with the “/” sign example marking:

mcr DOR 400 x 400 / EM 24 D / WK1

The mcr DOR smoke door damper for fire ventilation systems is equipped with a limit switch.

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems



downloadable models
on the website
under the designer zone tab

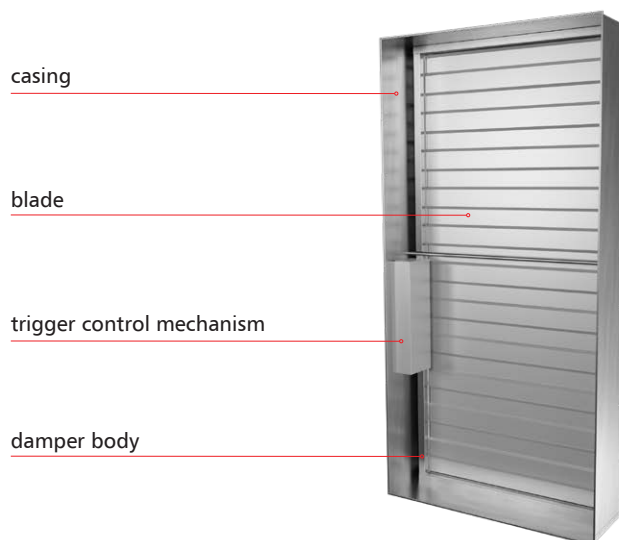


- » EIS120, E600
- » Fire resistance class: EI120 (v_{ew} , $i \rightarrow o$)S1000C₁₀₀₀₀AAmulti.
- » Certificate of constancy of performance 2434-CPR-0240
- » Dampers certified for compliance with EN 12101-8
- » Dampers rated under EN 13501-4 and tested under EN 1366-10
- » Dedicated for application in smoke removal and air supply shafts
- » Large active area, small resistances, quick installation
- » Certified installation with a system grille in set as per EN 12101-8

17.1| Application

The mcr WIP LD smoke control dampers are intended for installation in manually or automatically operated fire ventilation systems. The devices are used in fire ventilation systems or in mixed fire and comfort ventilation systems (smoke evacuation or air supply systems). The dampers prevent fire, smoke and fire gases from spreading to the adjacent compartments. During normal system operation, the damper blades are closed. The smoke control dampers blades in the fire compartment are opened, whereas in other areas the blades are closed.

17.2| Design



mcr WIP LD smoke control dampers consist of a casing with a rectangular cross-section, multiple moving damper blades – louvers rotating around their own axes – and a remotely activated trigger and control mechanism, which is installed inside the damper clearance. The damper casing is made of galvanized steel sheets or stainless steel sheets. The damper is also provided with a connection flange on one side. The other end is the so-called “bare-end”. The damper casing total length is 350 mm. Damper louvers are made of galvanized steel sheets or stainless steel. The damper blades revolve on their own axes, which consist of steel pins. A ventilation gasket is provided on the blades to ensure that the damper is “cold” sealed.

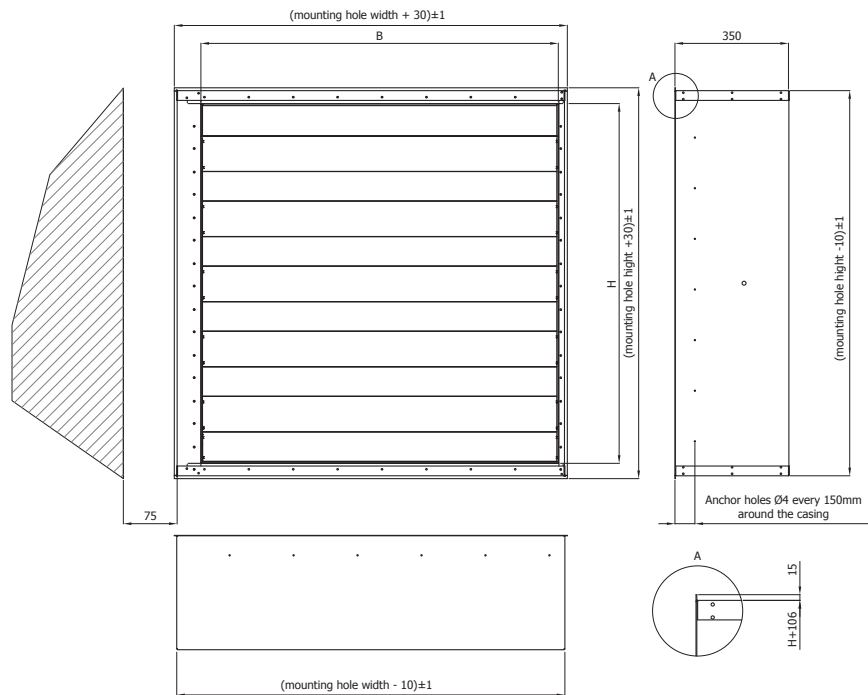
mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

17.3 | Versions

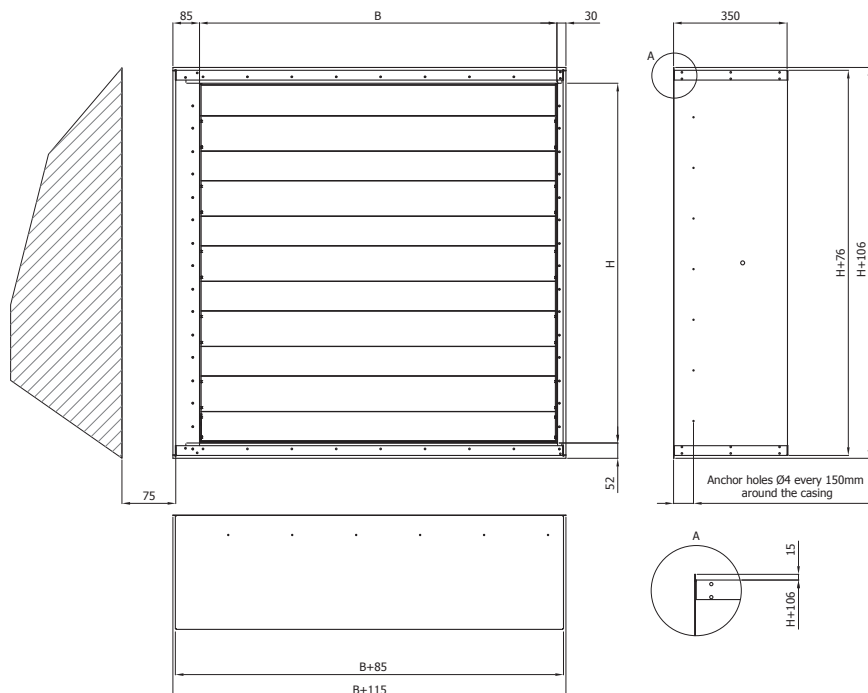
17.3.1 | Damper closing and opening with an actuator

During normal operation, the smoke control dampers are opened or closed. In case of fire, the smoke control dampers louvers are opened in the fire compartment area and closed in the other areas - the smoke control dampers is released remotely by feeding the supply voltage to the trigger control mechanism. mcr WIP LD smoke control dampers are equipped with a trigger control mechanism in the form of a BEE, BEN, BE axial actuator without a return spring (24 V AC/DC or 230 V AC). The BE, BEE, BEN series actuators are equipped with limit switches used to monitor the damper blade position. Furthermore, a mechanical position indicator is placed on the actuator. Smoke control dampers with BEE, BEN, BE actuators can be opened/closed by supplying voltage to the actuator terminals. Dampers with those actuators may be opened/closed manually using a key.

» set in a masonry wall with the flange facing the wall



» set in a masonry wall with the flange facing the wall



mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

17.4 | Dimensions

- » nominal width B: from 300 mm to 1100 mm
- » nominal height H from 600 mm to 2300 mm
- » maximum single damper cross-section surface up to 2.53 m²

Apart from the standard dimensions, smoke control dampers may be manufactured with intermediate dimensions (at 1 mm increments within the given ranges). The exception are dampers whose height value falls within the 36-54 ranges, e.g. 136-154, 236-254...

17.5 | Installation

- » mcr WIP LD rectangular dampers are rated EI120(v_{ew} i→o)S 1000C₁₀₀₀₀AAmulti if installed in yielding wall/shaft partitions made from gypsum board panels with the thickness of at least 125 mm.
- » mcr WIP LD rectangular dampers are rated EI120(v_{ew} i→o)S 1000C₁₀₀₀₀AAmulti if installed in wall/shaft partitions made of concrete, bricks, hollow bricks, masonry or prefabricated slabs with a min. thickness of 125 mm.
- » mcr WIP LD rectangular dampers are rated E600(v_{ew} i→o)S 1000C₁₀₀₀₀AAmulti if installed in wall/shaft partitions made of concrete, bricks, hollow bricks, masonry or prefabricated slabs with a min. thickness of 125 mm.

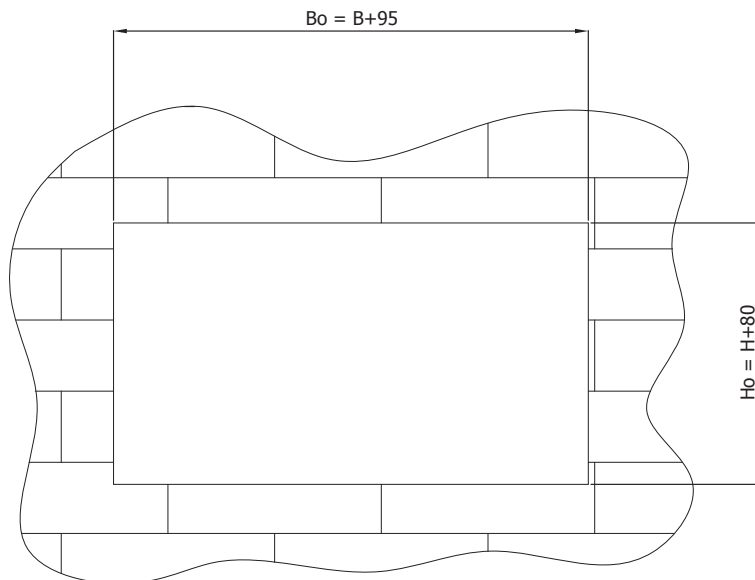
17.5.1 | Preparation of installation openings

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

Preferred

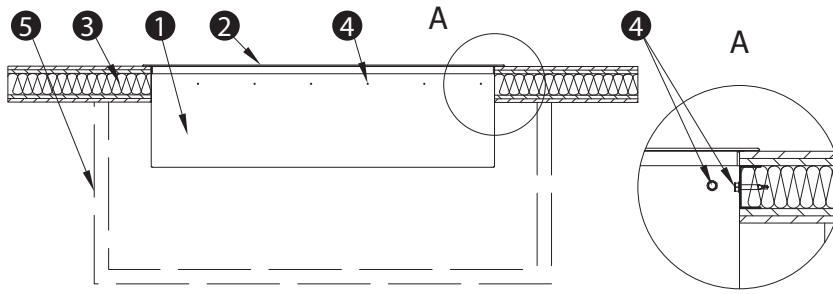
Bo = (B+95) mm

Ho = (H+80) mm



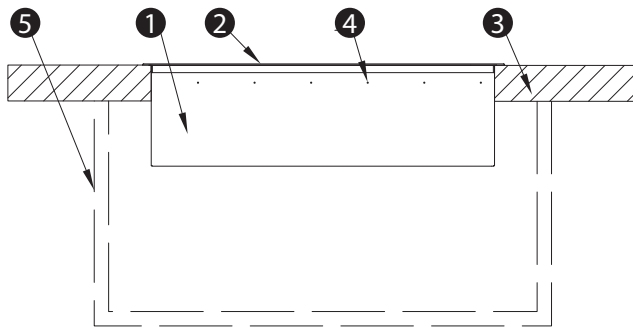
> mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

17.5.2 | Installation in shaft walls



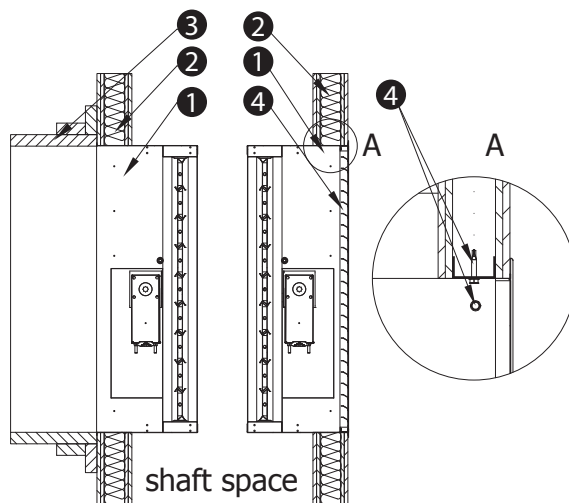
- 1. mcr WIP LD BxH smoke damper
- 2. MWS system grille (optional)
- 3. GK shaft wall
- 4. Installation anchors
- 5. Vertical fire ventilation shaft

17.5.3 | Installation in light shaft walls



- 1. mcr WIP LD BxH smoke damper
- 2. MWS system grille (optional)
- 3. GB shaft wall
- 4. Installation anchors
- 5. Vertical fire ventilation shaft

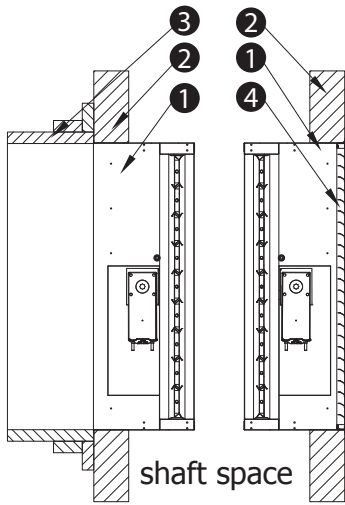
17.5.4 | Installation in concrete walls or masonry shafts



- 1. mcr WIP LD BxH smoke damper
- 2. Plasterboard wall
- 3. Multi-compartment smoke extract duct
– e.g. made of fire-proof boards
- 4. MWS system grille (optional)

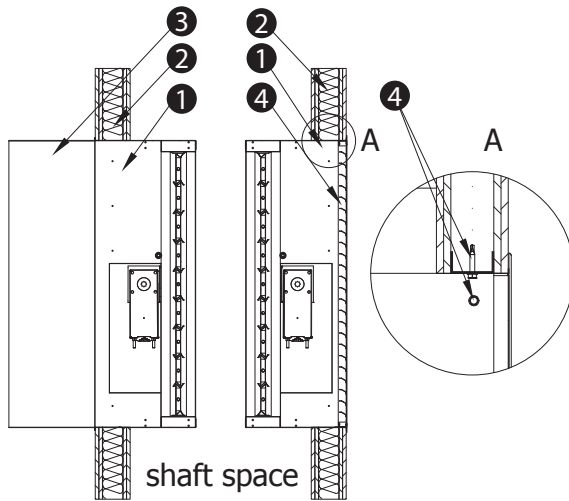
mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

17.5.5 | Sample installation in light walls and with multi-compartment ducts or grilles



- 1. mcr WIP LD BxH smoke damper
- 2. Solid wall
- 3. Multi-compartment smoke extract duct
– e.g. made of fire-proof boards
- 4. MWS system grille (optional)

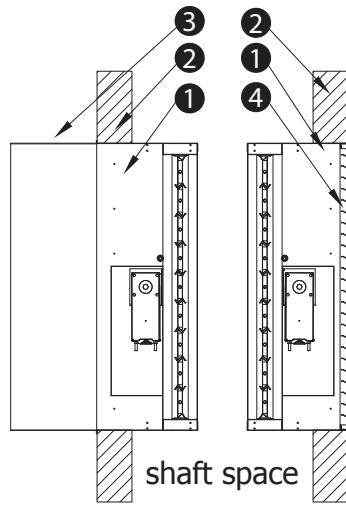
17.5.6 | Sample installation in concrete or masonry walls and with multi-compartment ducts or grilles



- 1. mcr WIP LD BxH smoke damper
- 2. Plasterboard wall
- 3. Single-compartment smoke extract duct
– e.g. made of metal sheets
- 4. MWS system grille (optional)

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

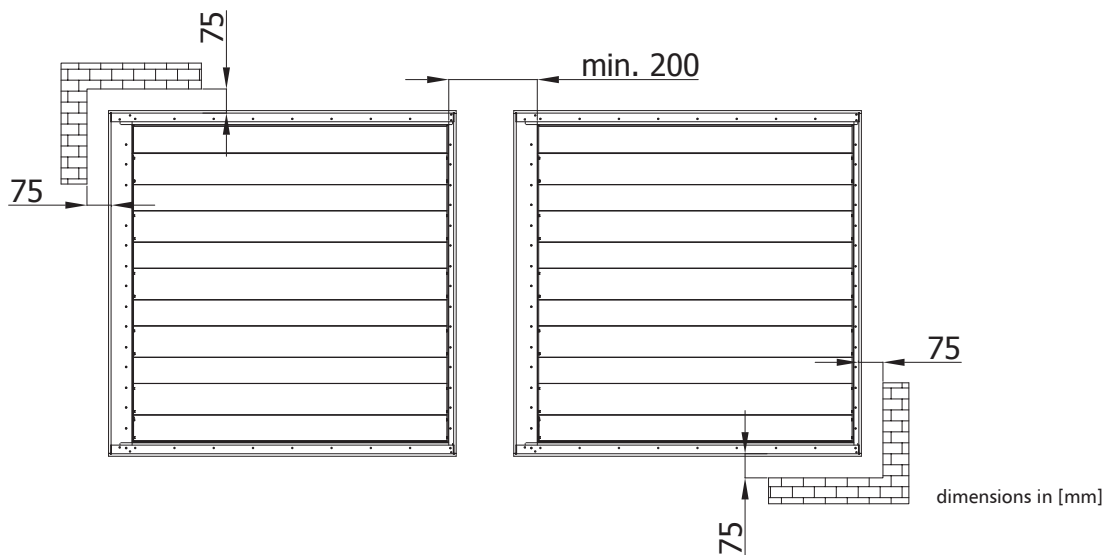
17.5.7 | Sample installation in light walls and with single-compartment ducts or grilles



- 1. mcr WIP LD BxH smoke damper
- 2. Solid wall
- 3. Multi-compartment smoke extract duct
– e.g. made of fire-proof boards
- 4. MWS system grille (optional)

* Smoke extraction ducts should be made in accordance with the ducts manufacturer’s guidelines. The ducts must have an adequate fire resistance rating in accordance with the fire resistance rating provided for the entire solution. Seal all connections between the damper, wall and the ducts with the appropriate grout/glue/gaskets, ensuring that the fire resistance rating is maintained. A masking grille may terminate the system.

» Distance between systems and partitions



mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

17.6 | mcr WIP LD rectangular dampers technical parameters

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]																		
		600					700					800								
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]			
width B [mm]	300	4	0,18	0,15	2 151	5	30	0,21	0,17	2 510	5	30	0,24	0,20	2 868	5	31			
		6			3 227	12	41			3 765	11	41			4 303	11	41			
		8			4 303	21	48			5 020	20	48			5 737	19	48	7 171	30	54
		10			5 378	32	54			6 275	31	54			7 321	30	54			
	350	4	0,21	0,17	2 510	5	30	0,25	0,20	2 928	5	31	0,28	0,23	3 347	5	32			
		6			3 765	11	41			4 392	11	41			5 020	10	41	6 693	19	49
		8			5 020	20	48			5 856	19	48			6 693	19	49	8 366	29	55
		10			6 275	31	54			7 321	30	54			8 366	30	55			
	400	4	0,24	0,20	2 868	5	31	0,28	0,23	3 347	5	32	0,32	0,27	3 825	5	32			
		6			4 303	11	41			5 020	11	42			5 737	10	41	7 649	19	50
		8			5 737	20	49			6 693	19	49			7 649	19	50	9 562	29	55
		10			7 171	31	55			8 366	30	55			9 562	29	55			
450	4	0,27	0,22	3 227	5	31	0,32	0,26	3 765	5	32	0,36	0,30	4 303	5	33				
	6			4 841	11	42			5 647	11	42			6 454	10	42	8 605	19	50	
	8			6 454	20	50			7 530	19	50			8 605	19	50	10 757	29	56	
	10			8 068	31	55			9 412	30	55			10 757	29	56				
500	4	0,30	0,25	3 586	5	32	0,35	0,29	4 183	5	33	0,40	0,33	4 781	5	33				
	6			5 378	11	42			6 275	11	43			7 171	10	42	9 562	19	51	
	8			7 171	20	50			8 366	19	50			9 562	19	51	11 952	29	56	
	10			8 964	31	56			10 458	30	56			11 952	29	56				
550	4	0,33	0,27	3 944	5	32	0,39	0,32	4 602	5	33	0,44	0,37	5 259	5	34				
	6			5 916	11	43			6 902	11	43			7 888	10	43	10 518	19	51	
	8			7 888	20	50			9 203	19	50			10 518	19	51	13 147	29	56	
	10			9 860	31	56			11 504	30	56			13 147	29	56				
600	4	0,36	0,30	4 303	5	33	0,42	0,35	5 020	5	33	0,48	0,40	5 737	5	34				
	6			6 454	11	43			7 530	11	44			8 605	10	43	11 474	19	51	
	8			8 605	19	50			10 040	19	51			11 474	19	51	14 342	29	57	
	10			10 757	30	56			12 550	30	57			14 342	29	57				
650	4	0,39	0,32	4 661	5	33	0,46	0,38	5 438	5	34	0,52	0,43	6 215	5	34				
	6			6 992	11	43			8 157	10	43			9 323	10	43	12 430	19	52	
	8			9 323	19	50			10 876	19	51			12 430	19	52	15 538	29	57	
	10			11 653	30	56			13 595	29	57			15 538	29	57				
700	4	0,42	0,35	5 020	5	33	0,49	0,41	5 856	5	34	0,56	0,46	6 693	4	32				
	6			7 530	11	44			8 785	10	43			10 040	10	44	13 386	18	51	
	8			10 040	19	51			11 713	19	51			13 386	18	51	16 733	28	57	
	10			12 550	30	57			14 641	29	57			16 733	28	57				
750	4	0,45	0,37	5 378	5	34	0,53	0,44	6 275	5	34	0,60	0,50	7 171	4	32				
	6			8 068	11	44			9 412	10	43			10 757	10	44	14 342	18	52	
	8			10 757	19	51			12 550	19	52			14 342	18	52	17 928	28	57	
	10			13 446	30	57			15 687	29	57			17 928	28	57				
800	4	0,48	0,40	5 737	5	34	0,56	0,46	6 693	4	32	0,64	0,53	7 649	4	32				
	6			8 605	10	43			10 040	7	39			11 474	10	44	15 299	18	52	
	8			11 474	19	51			13 386	11	45			15 299	18	52	19 123	28	58	
	10			14 342	29	57			16 733	28	57			19 123	28	58				
850	4	0,51	0,42	6 096	4	31	0,60	0,49	7 111	4	32	0,68	0,56	8 127	4	33				
	6			9 143	10	43			10 667	10	44			12 191	10	45	16 255	17	51	
	8			12 191	18	51			14 223	18	52			16 255	17	51	20 318	27	57	
	10			15 239	28	57			17 779	28	57			20 318	27	57				
900	4	0,54	0,45	6 454	4	32	0,63	0,52	7 530	4	32	0,72	0,60	8 605	4	33				
	6			9 681	10	44			11 295	10	44			12 908	10	45	17 211	17	52	
	8			12 908	18	51			15 060	17	51			17 211	17	52	21 514	27	58	
	10			16 135	28	57			18 824	27	57			21 514	27	58				
950	4	0,57	0,47	6 813	4	32	0,67	0,55	7 948	4	32	0,76	0,63	9 084	4	33				
	6			10 219	10	44			11 922	10	44			13 625	10	44	18 167	17	52	
	8			13 625	18	51			15 896	17	51			18 167	17	52	22 709	27	58	
	10			17 032	28	57			19 870	27	57			22 709	27	58				
1000	4	0,60	0,50	7 171	4	32	0,70	0,58	8 366	4	33	0,80	0,66	9 562	4	33				
	6			10 757	10	44			12 550	10	45			14 342	9	44	19 123	17	52	
	8			14 342	18	52			16 733	17	52			19 123	17	52	23 904	26	58	
	10			17 928	28	57			20 916	27	58			23 904	26	58				
1050	4	0,63	0,52	7 530	4	32	0,74	0,61	8 785	4	33	0,84	0,70	10 040	4	34				
	6			11 295	10	44			13 177	10	45			15 060	9	44	20 079	17	52	
	8			15 060	18	52			17 569	17	52			20 079	17	52	25 099	26	58	
	10			18 824	28	58			21 962	27	58			25 099	26	58				
1100	4	0,66	0,55	7 888	4	33	0,77	0,64	9 203	4	34	0,88	0,73	10 518	4	34				
	6			11 832	10	45			13 805	10	45			15 777	9	44	21 036	17	53	
	8			15 777	18	52			18 406	17	52			21 036	17	53	26 294	26	58	
	10			19 721	28	58			23 008	27	58			26 294	26	58				

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		900					1000					1100					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	300	4	0,27	0,22	3 227	5	31	0,30	0,25	3 586	5	32	0,33	0,27	3 944	6,25	35
		6			4 841	10	41			5 378	10	41			5 916	13	44
		8			6 454	19	49			7 171	19	49			7 888	24	53
		10			8 068	29	54			8 964	29	55			9 860	36	58
	350	4	0,32	0,26	3 765	4	29	0,35	0,29	4 183	4	30	0,39	0,32	4 602	5	33
		6			5 647	10	41			6 275	10	42			6 902	13	45
		8			7 530	18	49			8 366	18	49			9 203	23	53
		10			9 412	28	55			10 458	28	55			11 504	35	58
	400	4	0,36	0,30	4 303	4	30	0,40	0,33	4 781	4	30	0,44	0,37	5 259	5	34
		6			6 454	10	42			7 171	10	42			7 888	13	46
		8			8 605	18	49			9 562	18	50			10 518	23	53
		10			10 757	28	55			11 952	28	56			13 147	35	59
450	4	0,41	0,34	4 841	4	30	0,45	0,37	5 378	4	31	0,50	0,41	5 916	5	34	
	6			7 261	10	42			8 068	10	43			8 874	13	46	
	8			9 681	17	49			10 757	17	50			11 832	21	53	
	10			12 101	27	55			13 446	27	56			14 791	34	59	
500	4	0,45	0,37	5 378	4	31	0,50	0,42	5 976	4	31	0,55	0,46	6 574	5	35	
	6			8 068	10	43			8 964	10	43			9 860	13	47	
	8			10 757	17	50			11 952	17	50			13 147	21	53	
	10			13 446	27	56			14 940	27	56			16 434	34	59	
550	4	0,50	0,41	5 916	4	31	0,55	0,46	6 574	4	32	0,61	0,50	7 231	5	35	
	6			8 874	10	43			9 860	10	44			10 846	13	47	
	8			11 832	17	50			13 147	17	51			14 462	21	54	
	10			14 791	27	56			16 434	27	57			18 077	34	60	
600	4	0,54	0,45	6 454	4	32	0,60	0,50	7 171	4	32	0,66	0,55	7 888	5	35	
	6			9 681	10	44			10 757	10	44			11 832	13	47	
	8			12 908	17	50			14 342	17	51			15 777	21	54	
	10			16 135	27	56			17 928	27	57			19 721	34	60	
650	4	0,59	0,49	6 992	4	32	0,65	0,54	7 769	4	32	0,72	0,59	8 546	5	36	
	6			10 488	10	44			11 653	10	44			12 819	13	48	
	8			13 984	17	51			15 538	17	51			17 091	21	55	
	10			17 480	27	57			19 422	27	57			21 364	34	61	
700	4	0,63	0,52	7 530	4	32	0,70	0,58	8 366	4	33	0,77	0,64	9 203	5	36	
	6			11 295	9	43			12 550	9	43			13 805	11	47	
	8			15 060	17	51			16 733	17	52			18 406	21	55	
	10			18 824	26	57			20 916	26	57			23 008	33	60	
750	4	0,68	0,56	8 068	4	33	0,75	0,62	8 964	4	33	0,83	0,68	9 860	5	36	
	6			12 101	9	43			13 446	9	44			14 791	11	47	
	8			16 135	17	51			17 928	17	52			19 721	21	55	
	10			20 169	26	57			22 410	26	57			24 651	33	61	
800	4	0,72	0,60	8 605	4	33	0,80	0,66	9 562	4	33	0,88	0,73	10 518	5	37	
	6			12 908	9	43			14 342	9	44			15 777	11	47	
	8			17 211	17	52			19 123	17	52			21 036	21	55	
	10			21 514	26	57			23 904	26	58			26 294	33	61	
850	4	0,77	0,63	9 143	4	33	0,85	0,71	10 159	4	34	0,94	0,78	11 175	5	37	
	6			13 715	9	44			15 239	9	44			16 763	11	47	
	8			18 287	17	52			20 318	17	52			22 350	21	56	
	10			22 858	26	57			25 398	26	58			27 938	33	61	
900	4	0,81	0,67	9 681	4	33	0,90	0,75	10 757	4	34	0,99	0,82	11 832	5	37	
	6			14 522	9	44			16 135	9	44			17 749	11	48	
	8			19 362	17	52			21 514	16	52			23 665	20	55	
	10			24 203	26	58			26 892	25	58			29 581	31	61	
950	4	0,86	0,71	10 219	4	34	0,95	0,79	11 354	4	34	1,05	0,87	12 490	5	37	
	6			15 328	9	44			17 032	9	45			18 735	11	48	
	8			20 438	16	52			22 709	16	52			24 980	19	55	
	10			25 547	25	57			28 386	25	58			31 225	31	61	
1000	4	0,90	0,75	10 757	4	34	1,00	0,83	11 952	4	34	1,10	0,91	13 147	5	38	
	6			16 135	9	44			17 928	9	45			19 721	11	48	
	8			21 514	15	51			23 904	15	51			26 294	19	55	
	10			26 892	24	57			29 880	24	58			32 868	30	61	
1050	4	0,95	0,78	11 295	4	34	1,05	0,87	12 550	4	35	1,16	0,96	13 805	5	38	
	6			16 942	9	45			18 824	9	45			20 707	11	48	
	8			22 589	15	51			25 099	15	52			27 609	19	55	
	10			28 237	24	57			31 374	24	58			34 511	30	61	
1100	4	0,99	0,82	11 832	4	35	1,10	0,91	13 147	4	35	1,21	1,00	14 462	5	38	
	6			17 749	9	45			19 721	9	45			21 693	11	49	
	8			23 665	15	52			26 294	15	52			28 924	19	55	
	10			29 581	24	58			32 868	24	58			36 155	30	61	

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		1200					1300					1400					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	300	4			4 303	5	33			4 661	5	33			5 020	5	33
		6	0,36	0,30	6 454	9	40	0,39	0,32	6 992	9	40	0,42	0,35	7 530	8	40
		8			8 605	18	49			9 323	18	49			10 040	17	49
		10			10 757	28	55			11 653	27	55			12 550	26	55
	4					5 020	3,5			29					5 438	3,25	28
	6	0,42	0,35	7 530	10	42	0,46	0,38	8 157	9	42	0,49	0,41	8 785	9	42	
	8			10 040	17	49			10 876	17	49			11 713	16	49	
	10			12 550	27	55			13 595	26	55			14 641	25	55	
	4					5 737			3,5	29					6 215	3,25	29
	6	0,48	0,40	8 605	10	42	0,52	0,43	9 323	9	42	0,56	0,46	10 040	9	42	
	8			11 474	17	50			12 430	17	50			13 386	16	50	
	10			14 342	27	56			15 538	26	56			16 733	25	56	
4					6 454	3,5			30					6 992	3,25	29	
6	0,54	0,45	9 681	10	43	0,59	0,49	10 488	9	43	0,63	0,52	11 295	9	43		
8			12 908	16	49			13 984	15	49			15 060	14	49		
10			16 135	25	55			17 480	24	55			18 824	23	55		
4					7 171			3,5	30					7 769	3,25	30	
6	0,60	0,50	10 757	10	43	0,65	0,54	11 653	9	43	0,70	0,58	12 550	9	43		
8			14 342	16	50			15 538	15	49			16 733	14	49		
10			17 928	25	56			19 422	24	56			20 916	23	55		
4					7 888			3,5	31					8 546	3,25	30	
6	0,66	0,55	11 832	10	44	0,72	0,59	12 819	9	44	0,77	0,64	13 805	9	44		
8			15 777	16	50			17 091	15	50			18 406	14	49		
10			19 721	25	56			21 364	24	56			23 008	23	56		
4					8 605			3,5	31					9 323	3,25	30	
6	0,72	0,60	12 908	10	44	0,78	0,65	13 984	9	44	0,84	0,70	15 060	9	44		
8			17 211	16	51			18 645	16	51			20 079	15	51		
10			21 514	26	57			23 306	25	57			25 099	24	57		
4					9 323			3,5	31					10 099	3,25	31	
6	0,78	0,65	13 984	10	44	0,85	0,70	15 149	9	44	0,91	0,76	16 314	9	44		
8			18 645	16	51			20 199	16	51			21 753	15	51		
10			23 306	26	57			25 249	25	57			27 191	24	57		
4					10 040			3,5	32					10 876	3,25	31	
6	0,84	0,70	15 060	8	43	0,91	0,76	16 314	8	42	0,98	0,81	17 569	7	41		
8			20 079	16	52			21 753	16	51			23 426	15	51		
10			25 099	24	57			27 191	23	57			29 282	22	56		
4					10 757			3,5	32					11 653	3,25	31	
6	0,90	0,75	16 135	8	43	0,98	0,81	17 480	8	42	1,05	0,87	18 824	7	42		
8			21 514	16	52			23 306	16	52			25 099	15	52		
10			26 892	24	57			29 133	23	57			31 374	22	57		
4					11 474			3,5	32					12 430	3,25	32	
6	0,96	0,80	17 211	9	44	1,04	0,86	18 645	8	44	1,12	0,93	20 079	8	44		
8			22 948	16	52			24 860	16	52			26 772	15	52		
10			28 685	25	58			31 075	24	58			33 466	23	58		
4					12 191			4	34					13 207	4	35	
6	1,02	0,85	18 287	9	44	1,11	0,92	19 810	8	44	1,19	0,99	21 334	8	44		
8			24 382	17	53			26 414	16	53			28 446	16	53		
10			30 478	25	58			33 017	25	58			35 557	24	58		
4					12 908			4	35					13 984	4	35	
6	1,08	0,90	19 362	9	44	1,17	0,97	20 976	8	44	1,26	1,05	22 589	8	44		
8			25 816	15	52			27 968	15	52			30 119	14	52		
10			32 270	24	58			34 960	23	58			37 649	22	57		
4					13 625			4	35					14 761	4	35	
6	1,14	0,95	20 438	9	45	1,24	1,03	22 141	8	45	1,33	1,10	23 844	8	45		
8			27 251	14	51			29 521	14	51			31 792	13	51		
10			34 063	23	57			36 902	22	57			39 740	21	57		
4					14 342			4	35					15 538	4	35	
6	1,20	1,00	21 514	9	45	1,30	1,08	23 306	8	45	1,40	1,16	25 099	8	45		
8			28 685	14	51			31 075	13	50			33 466	12	50		
10			35 856	22	57			38 844	21	57			41 832	20	57		
4					15 060			4	35					16 314	4	36	
6	1,26	1,05	22 589	9	45	1,37	1,13	24 472	8	45	1,47	1,22	26 354	8	45		
8			30 119	14	51			32 629	13	51			35 139	12	50		
10			37 649	22	58			40 786	21	57			43 924	20	57		
4					15 777			4	36					17 091	4	36	
6	1,32	1,10	23 665	9	45	1,43	1,19	25 637	8	45	1,54	1,28	27 609	8	45		
8			31 553	14	51			34 183	13	51			36 812	12	51		
10			39 442	22	58			42 728	21	57			46 015	20	57		

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		1500					1600					1700					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	300	4	0,45	0,37	5 378	5	34	0,48	0,40	5 737	5	34	0,51	0,42	6 096	5	34
		6			8 068	8	39			8 605	7	38			9 143	7	38
		8			10 757	17	49			11 474	16	49			12 191	16	49
		10			13 446	25	55			14 342	25	55			15 239	24	55
	350	4	0,53	0,44	6 275	2,75	27	0,56	0,46	6 693	2,5	26	0,60	0,49	7 111	2,25	25
		6			9 412	9	42			10 040	9	42			10 667	8	41
		8			12 550	16	49			13 386	15	49			14 223	15	49
		10			15 687	24	55			16 733	24	55			17 779	23	55
	400	4	0,60	0,50	7 171	2,75	27	0,64	0,53	7 649	2,5	26	0,68	0,56	8 127	2,25	25
		6			10 757	9	42			11 474	9	42			12 191	8	42
		8			14 342	16	50			15 299	15	50			16 255	15	49
		10			17 928	24	56			19 123	24	55			20 318	23	55
450	4	0,68	0,56	8 068	2,75	28	0,72	0,60	8 605	2,5	27	0,77	0,63	9 143	2,25	26	
	6			12 101	9	43			12 908	9	43			13 715	8	43	
	8			16 135	13	48			17 211	13	48			18 287	12	47	
	10			20 169	22	55			21 514	21	54			22 858	20	54	
500	4	0,75	0,62	8 964	2,75	28	0,80	0,66	9 562	2,5	27	0,85	0,71	10 159	2,25	26	
	6			13 446	9	43			14 342	9	43			15 239	8	43	
	8			17 928	13	49			19 123	13	48			20 318	12	48	
	10			22 410	22	55			23 904	21	55			25 398	20	55	
550	4	0,83	0,68	9 860	2,75	29	0,88	0,73	10 518	2,5	28	0,94	0,78	11 175	2,25	26	
	6			14 791	9	44			15 777	9	44			16 763	8	43	
	8			19 721	13	49			21 036	13	49			22 350	12	48	
	10			24 651	22	56			26 294	21	55			27 938	20	55	
600	4	0,90	0,75	10 757	2,75	29	0,96	0,80	11 474	2,5	28	1,02	0,85	12 191	2,25	27	
	6			16 135	9	44			17 211	9	44			18 287	8	44	
	8			21 514	15	51			22 948	14	50			24 382	14	50	
	10			26 892	23	57			28 685	23	57			30 478	22	56	
650	4	0,98	0,81	11 653	2,75	29	1,04	0,86	12 430	2,5	28	1,11	0,92	13 207	2,25	27	
	6			17 480	9	44			18 645	9	44			19 810	8	44	
	8			23 306	15	51			24 860	14	51			26 414	14	51	
	10			29 133	23	57			31 075	23	57			33 017	22	57	
700	4	1,05	0,87	12 550	2,75	30	1,12	0,93	13 386	2,5	29	1,19	0,99	14 223	2,25	28	
	6			18 824	7	41			20 079	6	40			21 334	6	39	
	8			25 099	15	51			26 772	14	51			28 446	14	51	
	10			31 374	21	56			33 466	20	56			35 557	19	55	
750	4	1,13	0,93	13 446	2,75	30	1,20	1,00	14 342	2,5	29	1,28	1,06	15 239	2,25	28	
	6			20 169	7	41			21 514	6	40			22 858	6	39	
	8			26 892	15	52			28 685	14	51			30 478	14	51	
	10			33 615	21	56			35 856	20	56			38 097	19	56	
800	4	1,20	1,00	14 342	2,75	30	1,28	1,06	15 299	2,5	29	1,36	1,13	16 255	2,25	28	
	6			21 514	8	44			22 948	8	44			24 382	7	43	
	8			28 685	15	52			30 597	14	52			32 509	14	51	
	10			35 856	22	57			38 246	22	57			40 637	21	57	
850	4	1,28	1,06	15 239	4	35	1,36	1,13	16 255	4	36	1,45	1,20	17 271	4	36	
	6			22 858	8	44			24 382	8	44			25 906	7	44	
	8			30 478	16	53			32 509	16	53			34 541	15	53	
	10			38 097	24	58			40 637	23	58			43 177	23	58	
900	4	1,35	1,12	16 135	4	36	1,44	1,20	17 211	4	36	1,53	1,27	18 287	4	36	
	6			24 203	8	44			25 816	8	44			27 430	7	44	
	8			32 270	14	51			34 422	13	51			36 573	13	51	
	10			40 338	21	57			43 027	21	57			45 716	20	57	
950	4	1,43	1,18	17 032	4	36	1,52	1,26	18 167	4	36	1,62	1,34	19 302	4	36	
	6			25 547	8	44			27 251	8	44			28 954	7	44	
	8			34 063	12	51			36 334	12	50			38 605	11	50	
	10			42 579	20	57			45 418	19	57			48 256	18	56	
1000	4	1,50	1,25	17 928	4	36	1,60	1,33	19 123	4	36	1,70	1,41	20 318	4	37	
	6			26 892	8	45			28 685	8	44			30 478	7	44	
	8			35 856	11	49			38 246	11	49			40 637	10	48	
	10			44 820	19	56			47 808	18	56			50 796	17	55	
1050	4	1,58	1,31	18 824	4	36	1,68	1,39	20 079	4	37	1,79	1,48	21 334	4	37	
	6			28 237	8	45			30 119	8	45			32 001	7	45	
	8			37 649	11	50			40 159	11	49			42 669	10	48	
	10			47 061	19	57			50 198	18	56			53 336	17	56	
1100	4	1,65	1,37	19 721	4	37	1,76	1,46	21 036	4	37	1,87	1,55	22 350	4	37	
	6			29 581	8	45			31 553	8	45			33 525	7	45	
	8			39 442	11	50			42 071	11	49			44 700	10	49	
	10			49 302	19	57			52 589	18	56			55 876	17	56	

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

		height H [mm]															
		1800					1900					2000					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	300	4	0,54	0,45	6 454	5	34	0,57	0,47	6 813	5	35	0,60	0,50	7 171	5	35
		6			9 681	6	37			10 219	6	36			10 757	5	35
		8			12 908	15	49			13 625	15	49			14 342	14	48
		10			16 135	23	54			17 032	22	54			17 928	22	54
	350	4	0,63	0,52	7 530	2	23	0,67	0,55	7 948	1,75	22	0,70	0,58	8 366	1,5	20
		6			11 295	8	41			11 922	8	41			12 550	8	41
		8			15 060	14	49			15 896	14	48			16 733	13	48
		10			18 824	22	54			19 870	21	54			20 916	21	54
	400	4	0,72	0,60	8 605	2	24	0,76	0,63	9 084	1,75	22	0,80	0,66	9 562	1,5	21
		6			12 908	8	42			13 625	8	42			14 342	8	41
		8			17 211	14	49			18 167	14	49			19 123	13	49
		10			21 514	22	55			22 709	21	55			23 904	21	55
	450	4	0,81	0,67	9 681	2	24	0,86	0,71	10 219	1,75	23	0,90	0,75	10 757	1,5	21
		6			14 522	8	42			15 328	8	42			16 135	8	42
		8			19 362	11	47			20 438	10	46			21 514	10	45
		10			24 203	19	54			25 547	18	53			26 892	17	53
	500	4	0,90	0,75	10 757	2	25	0,95	0,79	11 354	1,75	23	1,00	0,83	11 952	1,5	21
		6			16 135	8	43			17 032	8	43			17 928	8	42
		8			21 514	11	47			22 709	10	46			23 904	10	46
		10			26 892	19	54			28 386	18	54			29 880	17	53
	550	4	0,99	0,82	11 832	2	25	1,05	0,87	12 490	1,75	24	1,10	0,91	13 147	1,5	22
		6			17 749	8	43			18 735	8	43			19 721	8	43
		8			23 665	11	47			24 980	10	47			26 294	10	46
		10			29 581	19	55			31 225	18	54			32 868	17	54
	600	4	1,08	0,90	12 908	2	26	1,14	0,95	13 625	1,75	24	1,20	1,00	14 342	1,5	22
		6			19 362	8	44			20 438	8	43			21 514	8	43
		8			25 816	13	50			27 251	13	50			28 685	12	49
		10			32 270	21	56			34 063	20	56			35 856	20	56
	650	4	1,17	0,97	13 984	2	26	1,24	1,03	14 761	1,75	24	1,30	1,08	15 538	1,5	23
		6			20 976	8	44			22 141	8	44			23 306	8	44
		8			27 968	13	50			29 521	13	50			31 075	12	50
		10			34 960	21	57			36 902	20	56			38 844	20	56
	700	4	1,26	1,05	15 060	2	26	1,33	1,10	15 896	1,75	25	1,40	1,16	16 733	1,5	23
		6			22 589	5	38			23 844	5	37			25 099	4	36
		8			30 119	13	51			31 792	13	50			33 466	12	50
		10			37 649	18	55			39 740	17	54			41 832	16	54
	750	4	1,35	1,12	16 135	2	27	1,43	1,18	17 032	1,75	25	1,50	1,25	17 928	1,5	23
		6			24 203	5	38			25 547	5	37			26 892	4	36
		8			32 270	13	51			34 063	13	51			35 856	12	50
		10			40 338	18	55			42 579	17	55			44 820	16	54
	800	4	1,44	1,20	17 211	2	27	1,52	1,26	18 167	1,75	25	1,60	1,33	19 123	1,5	24
		6			25 816	7	43			27 251	7	43			28 685	7	43
		8			34 422	13	51			36 334	13	51			38 246	12	51
		10			43 027	20	57			45 418	19	57			47 808	19	56
	850	4	1,53	1,27	18 287	4	36	1,62	1,34	19 302	4	36	1,70	1,41	20 318	4	37
		6			27 430	7	43			28 954	7	43			30 478	7	43
		8			36 573	15	53			38 605	15	53			40 637	15	53
		10			45 716	22	58			48 256	22	58			50 796	21	58
	900	4	1,62	1,34	19 362	4	36	1,71	1,42	20 438	4	37	1,80	1,49	21 514	4	37
		6			29 043	7	44			30 657	7	43			32 270	7	43
		8			38 724	12	51			40 876	12	50			43 027	11	50
		10			48 406	19	57			51 095	18	56			53 784	18	56
	950	4	1,71	1,42	20 438	4	37	1,81	1,50	21 573	4	37	1,90	1,58	22 709	4	37
		6			30 657	7	44			32 360	7	44			34 063	7	43
		8			40 876	11	49			43 147	10	49			45 418	9	48
		10			51 095	18	56			53 933	17	55			56 772	16	55
	1000	4	1,80	1,49	21 514	4	37	1,90	1,58	22 709	4	37	2,00	1,66	23 904	4	37
		6			32 270	7	44			34 063	7	44			35 856	7	44
		8			43 027	9	47			45 418	8	46			47 808	8	45
		10			53 784	16	55			56 772	15	54			59 760	14	54
	1050	4	1,89	1,57	22 589	4	37	2,00	1,66	23 844	4	37	2,10	1,74	25 099	4	38
		6			33 884	7	44			35 766	7	44			37 649	7	44
		8			45 179	9	48			47 688	8	47			50 198	8	46
		10			56 473	16	55			59 611	15	55			62 748	14	54
	1100	4	1,98	1,64	23 665	4	38	2,09	1,73	24 980	4	38	2,20	1,83	26 294	4	38
		6			35 497	7	45			37 470	7	45			39 442	7	44
		8			47 330	9	48			49 959	8	47			52 589	8	46
		10			59 162	16	55			62 449	15	55			65 736	14	54

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

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

v – velocity [m/s]
S_k – duct cross-section [m²]
S_e – damper active cross-section [m²]

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

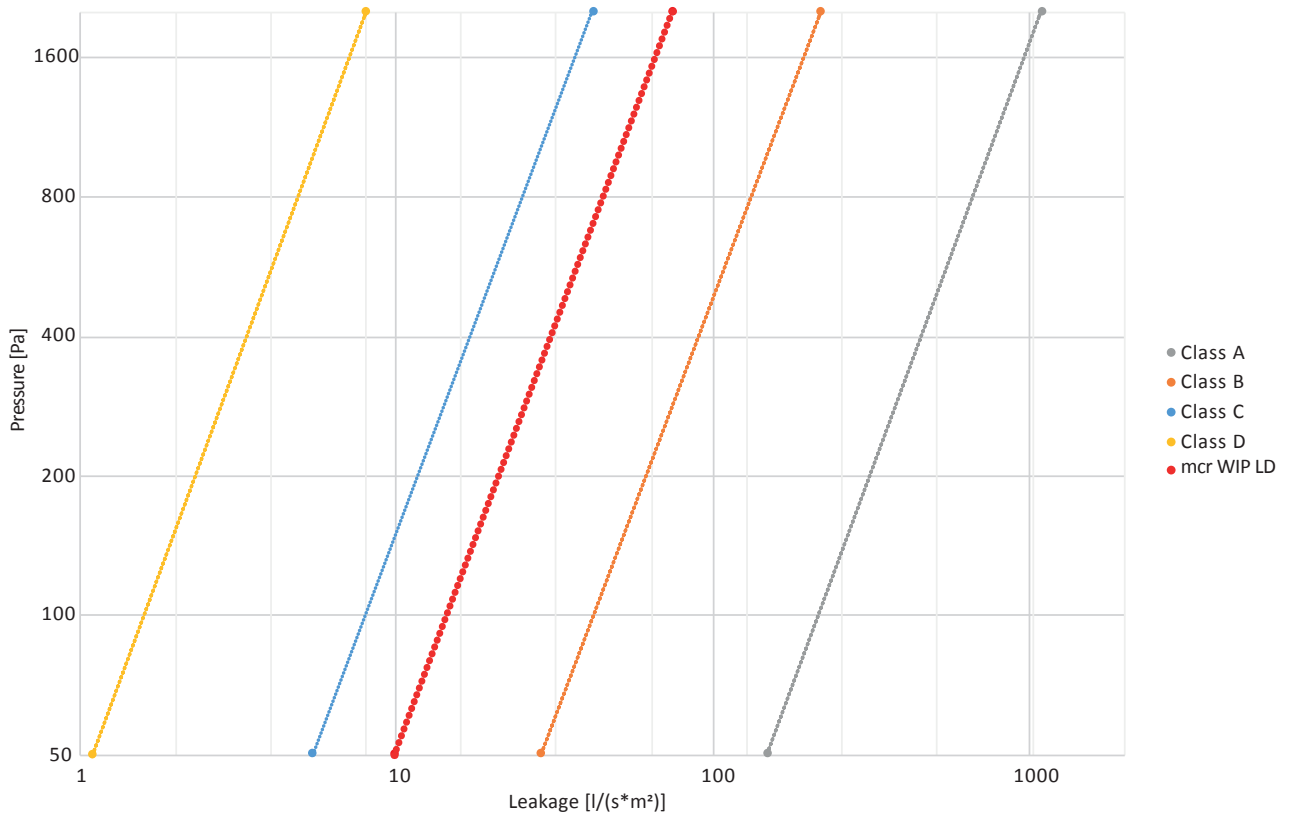
		height H [mm]															
		2100					2200					2300					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /s]	d _p [Pa]	L _{WA} [dB]
width B [mm]	300	4			7 530	5	35			7 888	5	35			8 247	5	36
		6	0,63	0,52	11 295	5	34	0,66	0,55	11 832	4	32	0,69	0,57	12 370	4	31
		8			15 060	14	48			15 777	13	48			16 494	13	47
	10	18 824			21	54	19 721			20	53	20 617			19	53	
	350	4			8 785	1,25	18			9 203	1	15			9 621	0,75	12
		6	0,74	0,61	13 177	7	41	0,77	0,64	13 805	7	40	0,81	0,67	14 432	7	40
		8			17 569	13	48			18 406	12	47			19 243	12	47
	10	21 962			20	54	23 008			19	53	24 053			18	53	
	400	4			10 040	1,25	18			10 518	1	16			10 996	0,75	12
		6	0,84	0,70	15 060	7	41	0,88	0,73	15 777	7	41	0,92	0,76	16 494	7	41
		8			20 079	13	48			21 036	12	48			21 992	12	48
	10	25 099			20	54	26 294			19	54	27 490			18	54	
450	4			11 295	1,25	19			11 832	1	16			12 370	0,75	13	
	6	0,95	0,78	16 942	7	42	0,99	0,82	17 749	7	42	1,04	0,86	18 555	7	41	
	8			22 589	9	44			23 665	8	43			24 741	7	42	
10	28 237			16	52	29 581			15	51	30 926			14	51		
500	4			12 550	1,25	19			13 147	1	17			13 745	0,75	13	
	6	1,05	0,87	18 824	7	42	1,10	0,91	19 721	7	42	1,15	0,95	20 617	7	42	
	8			25 099	9	45			26 294	8	44			27 490	7	43	
10	31 374			16	53	32 868			15	52	34 362			14	51		
550	4			13 805	1,25	20			14 462	1	17			15 119	0,75	13	
	6	1,16	0,96	20 707	7	43	1,21	1,00	21 693	7	42	1,27	1,05	22 679	7	42	
	8			27 609	9	45			28 924	8	44			30 239	7	43	
10	34 511			16	53	36 155			15	52	37 798			14	52		
600	4			15 060	1,25	20			15 777	1	17			16 494	0,75	14	
	6	1,26	1,05	22 589	7	43	1,32	1,10	23 665	7	43	1,38	1,15	24 741	7	42	
	8			30 119	12	49			31 553	11	49			32 988	11	48	
10	37 649			19	55	39 442			18	55	41 234			17	55		
650	4			16 314	1,25	20			17 091	1	18			17 868	0,75	14	
	6	1,37	1,13	24 472	7	43	1,43	1,19	25 637	7	43	1,50	1,24	26 802	7	43	
	8			32 629	12	49			34 183	11	49			35 736	11	49	
10	40 786			19	56	42 728			18	55	44 671			17	55		
700	4			17 569	1,25	21			18 406	1	18			19 243	0,75	15	
	6	1,47	1,22	26 354	4	34	1,54	1,28	27 609	3	32	1,61	1,34	28 864	3	30	
	8			35 139	12	50			36 812	11	49			38 485	11	49	
10	43 924			15	53	46 015			14	52	48 107			13	52		
750	4			18 824	1,25	21			19 721	1	18			20 617	0,75	15	
	6	1,58	1,31	28 237	4	34	1,65	1,37	29 581	3	33	1,73	1,43	30 926	3	30	
	8			37 649	12	50			39 442	11	50			41 234	11	49	
10	47 061			15	53	49 302			14	53	51 543			13	52		
800	4			20 079	1,25	21			21 036	1	19			21 992	0,75	15	
	6	1,68	1,39	30 119	6	42	1,76	1,46	31 553	6	42	1,84	1,53	32 988	6	42	
	8			40 159	12	50			42 071	11	50			43 983	11	49	
10	50 198			18	56	52 589			17	56	54 979			16	55		
850	4			21 334	4	37			22 350	4	37			23 366	4	37	
	6	1,79	1,48	32 001	6	43	1,87	1,55	33 525	6	42	1,96	1,62	35 049	6	42	
	8			42 669	14	53			44 700	14	53			46 732	14	53	
10	53 336			21	58	55 876			20	58	58 415			20	58		
900	4			22 589	4	37			23 665	4	37			24 741	4	37	
	6	1,89	1,57	33 884	6	43	1,98	1,64	35 497	6	43	2,07	1,72	37 111	6	42	
	8			45 179	11	50			47 330	10	49			49 481	10	49	
10	56 473			17	56	59 162			16	55	61 852			15	55		
950	4			23 844	4	37			24 980	4	37			26 115	4	38	
	6	2,00	1,66	35 766	6	43	2,09	1,73	37 470	6	43	2,19	1,81	39 173	6	42	
	8			47 688	9	47			49 959	8	46			52 230	7	46	
10	59 611			15	54	62 449			14	54	65 288			13	53		
1000	4			25 099	4	37			26 294	4	38			27 490	4	38	
	6	2,10	1,74	37 649	6	43	2,20	1,83	39 442	6	43	2,30	1,91	41 234	6	43	
	8			50 198	7	44			52 589	6	43			54 979	5	41	
10	62 748			13	53	65 736			12	52	68 724			11	51		
1050	4			26 354	4	38			27 609	4	38			28 864	4	38	
	6	2,21	1,83	39 531	6	44	2,31	1,92	41 414	6	43	2,42	2,00	43 296	6	43	
	8			52 708	7	45			55 218	6	43			57 728	5	42	
10	65 885			13	53	69 023			12	52	72 160			11	51		
1100	4			27 609	4	38			28 924	4	39			30 239	4	39	
	6	2,31	1,92	41 414	6	44	2,42	2,01	43 386	6	44	2,53	2,10	45 358	6	43	
	8			55 218	7	45			57 848	6	44			60 477	5	42	
10	69 023			13	53	72 310			12	53	75 596			11	52		

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

17.7 | Damper active surface quick selection table [m2] (FREE AREA – APERTURE SIZES IN MM AND AREA IN MSQ)

Active surface a [m ²]	Width Bo [mm]																		
	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1195	
Height Ho [mm]	600	0,08	0,10	0,12	0,14	0,16	0,18	0,20	0,22	0,24	0,26	0,28	0,30	0,32	0,34	0,36	0,38	0,40	0,44
	700	0,09	0,12	0,14	0,17	0,19	0,22	0,24	0,26	0,29	0,31	0,34	0,36	0,39	0,41	0,43	0,46	0,48	0,53
	800	0,11	0,14	0,17	0,20	0,22	0,25	0,28	0,31	0,34	0,37	0,40	0,42	0,45	0,48	0,51	0,54	0,57	0,62
	900	0,13	0,16	0,19	0,22	0,26	0,29	0,32	0,36	0,39	0,42	0,45	0,49	0,52	0,55	0,58	0,62	0,65	0,71
	1000	0,14	0,18	0,22	0,25	0,29	0,33	0,36	0,40	0,44	0,47	0,51	0,55	0,58	0,62	0,66	0,69	0,73	0,80
	1100	0,16	0,20	0,24	0,28	0,32	0,36	0,41	0,45	0,49	0,53	0,57	0,61	0,65	0,69	0,73	0,77	0,81	0,89
	1200	0,18	0,22	0,27	0,31	0,36	0,40	0,45	0,49	0,54	0,58	0,63	0,67	0,72	0,76	0,81	0,85	0,90	0,98
	1300	0,19	0,24	0,29	0,34	0,39	0,44	0,49	0,54	0,59	0,64	0,68	0,73	0,78	0,83	0,88	0,93	0,98	1,07
	1400	0,21	0,26	0,32	0,37	0,42	0,48	0,53	0,58	0,64	0,69	0,74	0,80	0,85	0,90	0,96	1,01	1,06	1,16
	1500	0,23	0,28	0,34	0,40	0,46	0,51	0,57	0,63	0,69	0,74	0,80	0,86	0,92	0,97	1,03	1,09	1,15	1,25
	1600	0,24	0,30	0,37	0,43	0,49	0,55	0,61	0,67	0,74	0,80	0,86	0,92	0,98	1,04	1,11	1,17	1,23	1,35
	1700	0,26	0,32	0,39	0,46	0,52	0,59	0,65	0,72	0,78	0,85	0,92	0,98	1,05	1,11	1,18	1,25	1,31	1,44
	1800	0,27	0,34	0,41	0,48	0,55	0,62	0,69	0,76	0,83	0,90	0,97	1,04	1,11	1,18	1,25	1,32	1,39	1,53
	1900	0,29	0,37	0,44	0,51	0,59	0,66	0,74	0,81	0,88	0,96	1,03	1,11	1,18	1,25	1,33	1,40	1,48	1,62
	2000	0,31	0,39	0,46	0,54	0,62	0,70	0,78	0,86	0,93	1,01	1,09	1,17	1,25	1,32	1,40	1,48	1,56	1,71
	2100	0,32	0,41	0,49	0,57	0,65	0,74	0,82	0,90	0,98	1,07	1,15	1,23	1,31	1,40	1,48	1,56	1,64	1,80
	2200	0,34	0,43	0,51	0,60	0,69	0,77	0,86	0,95	1,03	1,12	1,21	1,29	1,38	1,47	1,55	1,64	1,73	1,89
	2300	0,36	0,45	0,54	0,63	0,72	0,81	0,90	0,99	1,08	1,17	1,26	1,35	1,45	1,54	1,63	1,72	1,81	1,98
2385	0,38	0,47	0,56	0,66	0,75	0,85	0,94	1,04	1,13	1,23	1,32	1,42	1,51	1,61	1,70	1,80	1,89	2,07	

17.8 | Sealed damper blade tightness according to EN1751



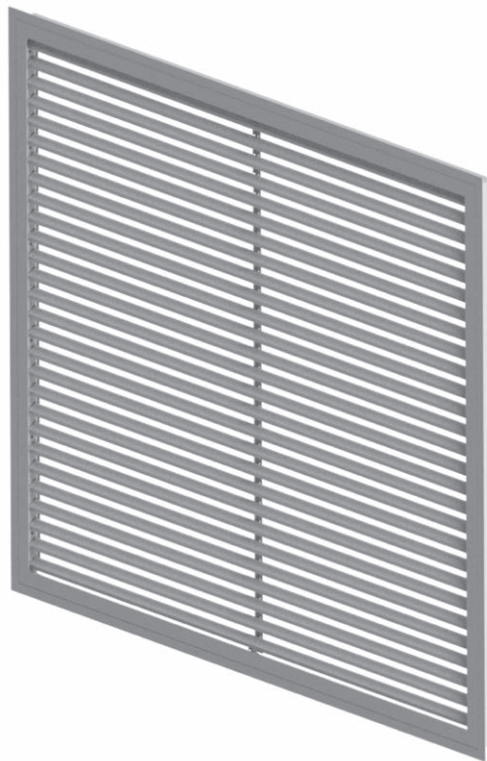
mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

17.9 | Estimated weight of the mcr WIP LD dampers [kg]

		Width B [mm]								
		300	400	500	600	700	800	900	1000	1100
Height H [mm]	600	20	21	23	26	30	35	37	39	41
	700	21	23	25	28	32	35	38	40	42
	800	22	24	29	35	37	41	43	49	55
	900	25	28	33	35	39	43	49	52	55
	1000	32	33	36	42	43	47	53	60	67
	1100	35	36	37	38	39	41	42	44	46
	1200	38	39	40	41	42	44	45	47	49
	1300	41	42	43	44	46	47	49	51	52
	1400	44	45	46	48	49	51	53	55	57
	1500	47	48	50	51	53	55	57	59	61
	1600	50	51	53	55	57	59	61	64	66
	1700	53	55	56	58	59	61	63	65	67
	1800	56	58	59	61	63	65	67	69	71
	1900	59	61	63	65	67	69	71	73	75
	2000	62	64	66	68	70	72	75	77	79
	2100	65	67	69	71	74	76	78	81	84
2200	68	70	72	75	77	80	82	85	88	
2300	71	73	76	78	81	83	86	89	92	

17.10 | Accessories

17.10.1 | mcr MWS system masking element

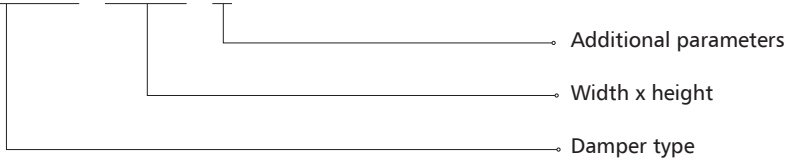


MWS system masking elements are designed to fulfill either supply or exhaust function. They enable the transfer of air through construction partitions. They come with fixed steel louvers with a 40 mm span, obscuring damper visibility. Bolts embedded in the damper are used to attach the masking element body. After installation, an outer frame is mounted on the masking element body so that the holes and bolts cannot be seen from the outside. Such a solution allows for installing the product even in the most visually-demanding applications. The masking elements are painted in RAL 9010 as a standard (available in any colour from the RAL range on request).

mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

Marking:

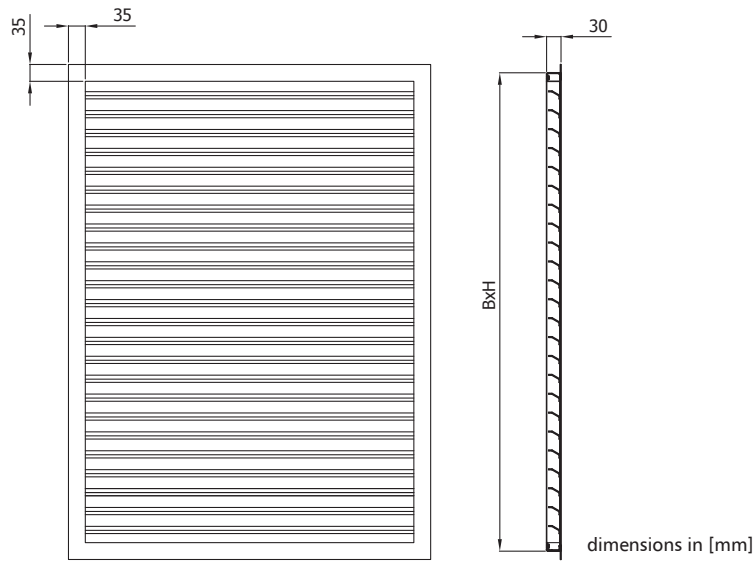
mcr MWS / B x H / X



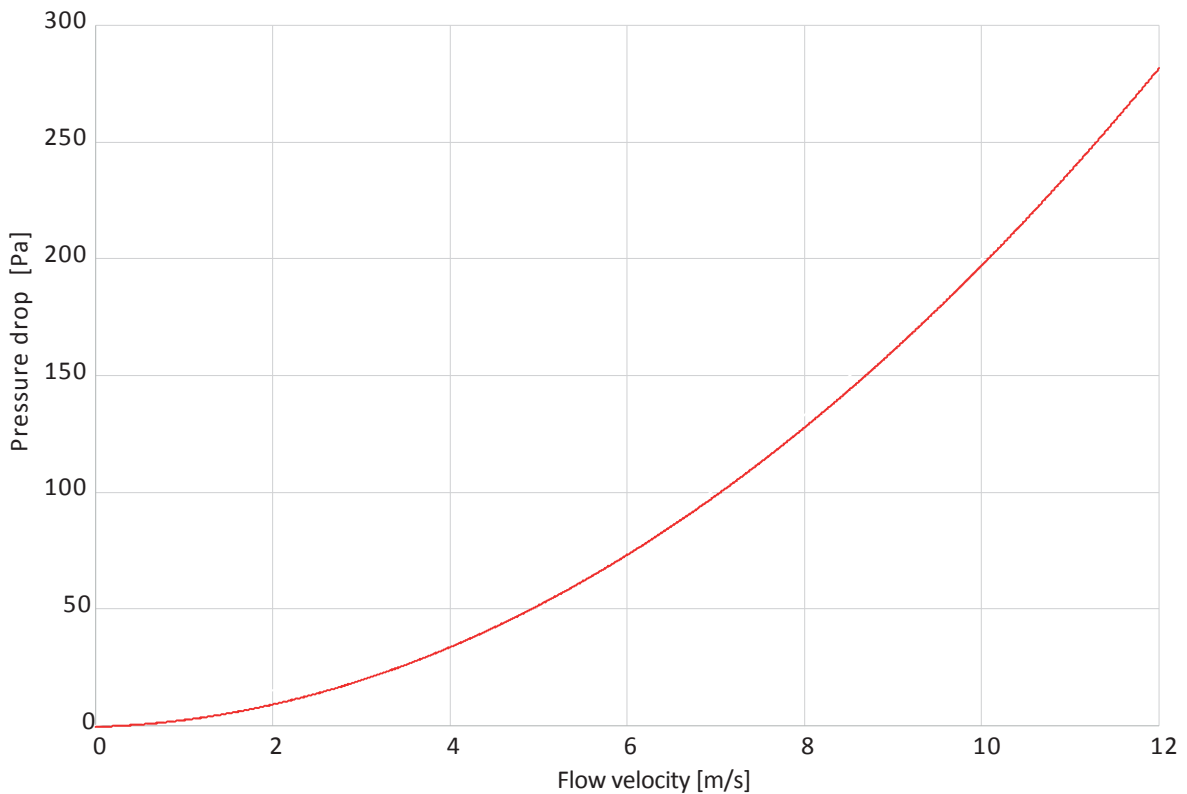
X – material

[no symbol] – RAL9010

RALXXXX – selected color code from the RAL palette

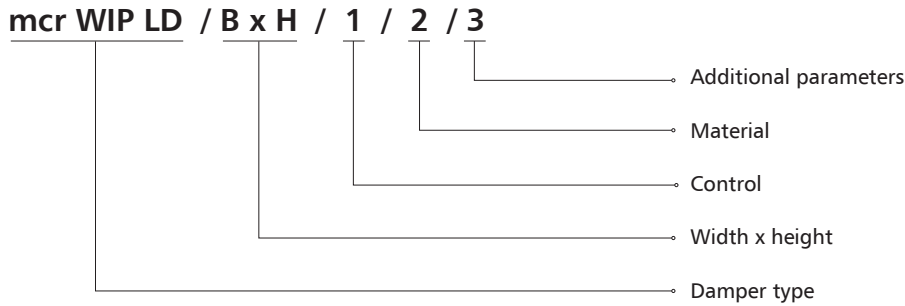


»Pressure drop on masking grilles



mcr WIP LD | Multi-blade smoke control damper for multi-zone fire ventilation systems

17.11 | Marking



1 – control

» trigger control mechanism

- BE24 – actuator without a return spring, U = 24 V AC/DC
- BE24-ST (with the BKE230-24 option) – actuator without a return spring, for the SBS Control system
- BE230 – actuator without a return spring, U = 230 V AC/DC
- BEE24 – actuator without a return spring, U = 24 V AC/DC
- BEN24 – actuator without a return spring, U = 24 V AC/DC
- BEE24-ST (with the BKE230-24 option) – actuator without a return spring, for the SBS Control system
- BEN24-ST (with the BKE230-24 option) – actuator without a return spring, for the SBS Control system
- BEE230 – actuator without a return spring, U = 230 V AC/DC
- BEN230 – actuator without a return spring, U = 230 V AC/DC

2 – material

- [no symbol] – galvanized steel, Zn 275 m² coating
- KN – stainless steel
- KK – 1.4404 acid-proof steel

3 – additional parameters

» Damper axis of rotation

- [no symbol] – horizontal axis of rotation
- [no symbol] – left damper
- [no symbol] – not painted
- RAL9005 – damper blades and internal casing from the side of the actuator are painted black

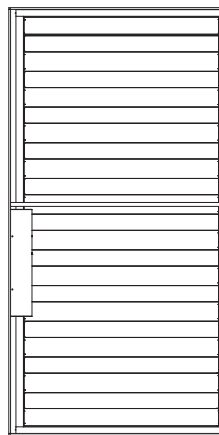
Note: separate additional parameters entered with the “/” sign

example marking: mcr WIP LD 400 x 400 BLE24

Door-type smoke control damper with a 24 V actuator with limit switches.

17.12 | Design standard

» Left damper



Chapter 16 - power supply and control (p. 262) contains the following information:
- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper.

18.1 | Compatibility with smoke control dampers fire dampers – quick drive selection table

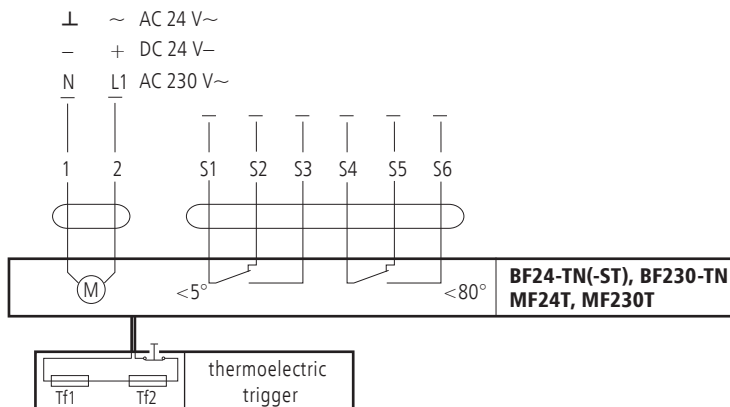
Smoke dampers fire dampers	Trigger control mechanisms													
	mcr FID B mcr	mcr FID S/S c/P	mcr FID S/S p/P mcr FID S/S p/O	mcr FID SV p/P mcr FID SV-M p/P	mcr FID PRO	mcr FID WING	mcr FID 240	mcr ZIPP	mcr WIP/S mcr WIP/T	mcr WIP/V mcr WIP/V-M	mcr WIP PRO/S mcr WIP PRO/T	mcr WIP PROV mcr WIP PROV-M	mcr DOR	mcr WIP LD
BFL24-T (-ST)		✓	✓		✓		✓		✓		✓			
BFL230-T		✓	✓		✓		✓		✓		✓			
BFN24-T (-ST)		✓	✓				✓		✓		✓			
BFN230-T		✓	✓				✓		✓		✓			
BE24	✓			✓						✓		✓		✓
BE230	✓			✓						✓		✓		✓
BEN24/BEE24	✓			✓						✓		✓		✓
BEN230/BEE230	✓			✓						✓		✓		✓
EXBF24-T		✓	✓		✓				✓		✓			
EXBF230-T		✓	✓		✓				✓		✓			
MF24T			✓				✓		✓		✓			
MF230T			✓				✓		✓		✓			
MLF24T		✓			✓									
MLF230T		✓			✓									
BF24TL-TN (-ST)		✓	✓		✓				✓		✓			
RST		✓	✓		✓	✓		✓						
RST/WK1		✓	✓		✓	✓		✓						
RST/WK2		✓	✓		✓									
RST-KW1/S		✓	✓		✓									
RST-KW1/S/WK2		✓	✓		✓						✓			
RST-KW1/24I		✓	✓		✓									
RST-KW1/24P		✓	✓		✓						✓			
RST-KW1/230I		✓	✓		✓									
RST-KW1/230P		✓	✓		✓						✓			
RST-EKI24								✓						
RST-EKP24								✓						
RST-EKI230								✓						
RST-EKP230								✓						
EM24D													✓	

18.2 | Actuators

18.2.1 | Electric actuators with a spring

Specifications	BF24-TN, MF24T	BF230-TN, MF230T
supply	AC 24 V 50/60 Hz DC 24 V	AC 220-240 V 50/60 Hz
power demand:		
- for spring tensioning	7 W	8 W
- for holding	2 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 5°, 80°	2 x EPU 3 (0,5) A 250 V~ 5°, 80°
- activation point		
torque:		
- motor	18 Nm	18 Nm
- return spring	12 Nm	12 Nm
cable connection:		
- motor (length: 0.9 m)	2 x 0,75 mm ²	2 x 0,75 mm ²
- auxiliary circuit breaker	6 x 0,75 mm ²	6 x 0,75 mm ²
operation time (0-90°):		
- motor	120 s	120 s
- return spring	~16 s	~16 s
operating temperature – range	-30 ... +50°C	-30 ... +50°C
noise level:		
- motor	max 45 dB (A)	max 45 dB (A)
- return spring	~63 dB (A)	~63 dB (A)

» electrical diagram for the BF...-T, MF...T series actuator:



NOTE:

24 V connection through a safety transformer.

To disconnect the 230 V actuator from the mains, a 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.

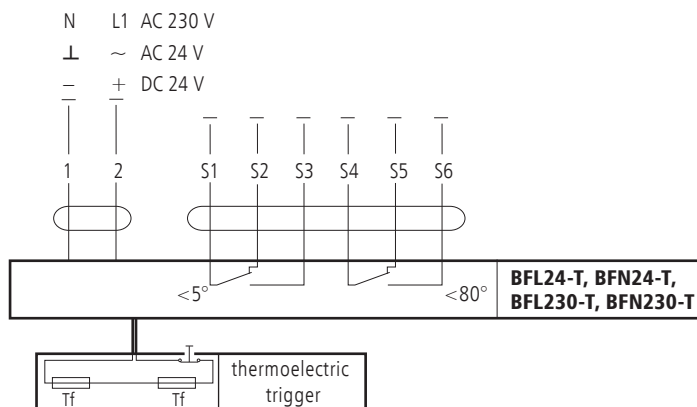
NOTE:

Actuator limit switches positions are provided for the voltage-free position.

Power supply and control | Trigger control mechanisms

Specifications	BFL24-T	BFL230-T	BFN24-T	BFN230-T	MLF24T	MLF230T
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	AC 24 V 50/60 Hz DC 24 V	AC 220-240 V 50/60 Hz
power demand:						
- for spring tensioning	2,5 W	3,5 W	4 W	5 W	5 W	5 W
- for holding	0,7 W	1,1 W	1,4 W	2,1 W	2,5 W	3 W
sizing (apparent power)	4 VA	6,5 VA	6 VA	10 VA	7 VA	7 VA
protection class	III	II	III	II	III	II
ingress protection rating	IP 54	IP 54	IP 54	IP 54	IP 54	IP 54
auxiliary circuit breaker:	2 x SPDT	2 x SPDT	2 x SPDT	2 x SPDT	2 x SPDT	2 x SPDT
- activation point	3 (0,5) A AC 250 V 5°, 80°	3 (0,5) A AC 250 V 5°, 80°	3 (0,5) A AC 250 V 5°, 80°	3 (0,5) A AC 250 V 5°, 80°	3 (0,5) A AC 250 V 5°, 80°	3 (0,5) A AC 250 V 5°, 80°
torque:						
- motor	4 Nm	4 Nm	9 Nm	9 Nm	4 Nm	4 Nm
- return spring	3 Nm	3 Nm	7 Nm	7 Nm	4 Nm	4 Nm
cable connection:						
- motor (length: 0.9 m)	2 x 0,75 mm ²	2 x 0,75 mm ²	2 x 0,75 mm ²	2 x 0,75 mm ²	2 x 0,75 mm ²	2 x 0,75 mm ²
- auxiliary circuit breaker	6 x 0,75 mm ²	6 x 0,75 mm ²	6 x 0,75 mm ²	6 x 0,75 mm ²	6 x 0,75 mm ²	6 x 0,75 mm ²
operation time (0-90°):						
- motor	< 60 s	< 60 s	< 60 s	< 60 s	40-75s	40-75s
- return spring	~20 s	~20 s	~20 s	~20 s	20s	20s
operating temperature – range	-30 ... +55°C	-30 ... +55°C	-30 ... +55°C	-30 ... +55°C	-30 ... +50°C	-30 ... +50°C
noise level:						
- motor	max 43 dB (A)	max 43 dB (A)	max 55 dB (A)	max 55 dB (A)	max 45 dB (A)	max 45 dB (A)
- return spring	~62 dB (A)	~62 dB (A)	~67 dB (A)	~67 dB (A)	~62 dB (A)	~62 dB (A)

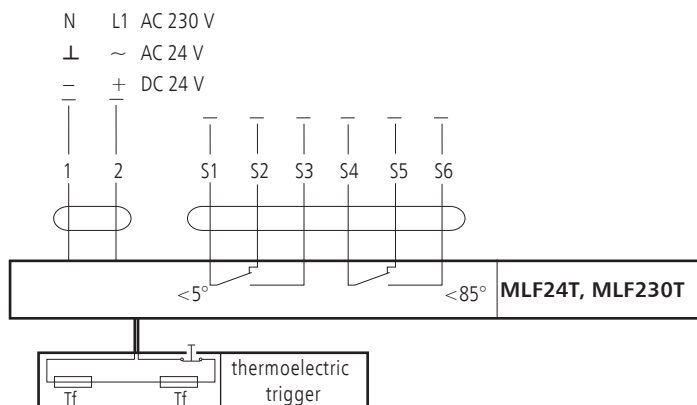
» electrical diagram for the BFL...-T, BFN...-T series actuator:



NOTE: 24 V connection through a safety transformer. To disconnect the 230 V actuator from the mains, a 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: actuator limit switches positions are provided for the voltage-free position.

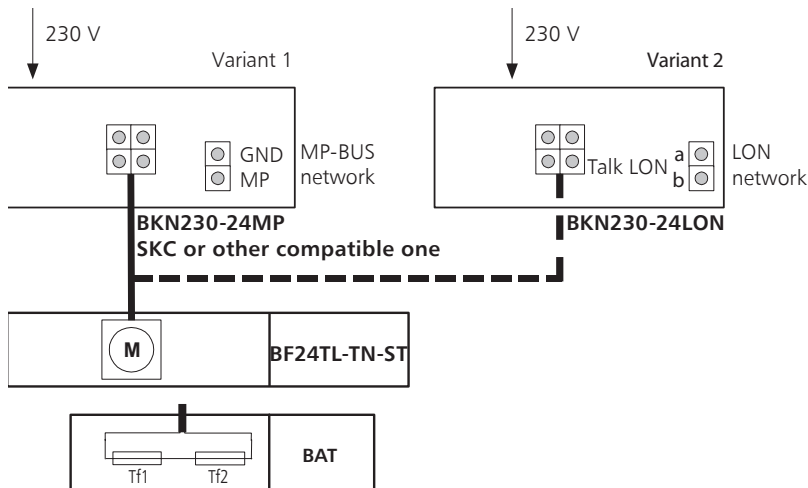
» electrical diagram for the MLF24T, MLF230T series actuator:



NOTE: 24 V connection through a safety transformer. To disconnect the 230 V actuator from the mains, a 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: actuator limit switches positions are provided for the voltage-free position.

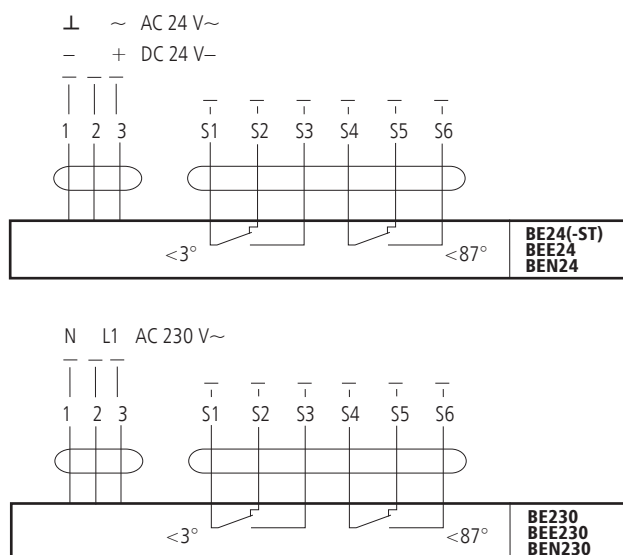
» electrical diagram for the BF24TL-T(-ST) and BF24TL(-ST) actuator:



18.2.2 | Electric actuators without return springs

Specifications	BE24, BE24-ST	BE230	BEE24	BEE230	BEN24	BEN230
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	AC 24 V 50/60 Hz DC 24 V	AC 230 V 50/60 Hz
power demand:						
- for spring tensioning	12 W	8 W	5,5 W	3,5 W	3 W	4 W
- for holding	0,5 W	0,5 W	0,1 W	0,4 W	0,1 W	0,4
sizing (apparent power)	18 VA	15 VA	5 VA	6 VA	6 V	7 V
protection class	III	II	III	II	III	II
ingress protection rating	IP 54	IP 54	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	2xSPDT 3A AC 250V	2xSPDT 3A AC 250V	2xSPDT 3A AC 250V	2xSPDT 3A AC 250V
- activation point	5°, 80°	5°, 80°	5°, 80°	5°, 80°	5°, 80°	5°, 80°
torque - motor	40 Nm	40 Nm	25 Nm	25 Nm	15 Nm	15 Nm
cable connection:						
- motor (length: 0.9 m)	2 x 0,75 mm ²	2 x 0,75 mm ²	2 x 0,75 mm ²	2 x 0,75 mm ²	2 x 0,75 mm ²	2 x 0,75 mm ²
- auxiliary circuit breaker	6 x 0,75 mm ²	6 x 0,75 mm ²	6 x 0,75 mm ²	6 x 0,75 mm ²	6 x 0,75 mm ²	6 x 0,75 mm ²
operation time (0-90°) - motor	< 60 s dla 90°	< 60 s dla 90°	60 s dla 90°	60 s dla 90°	30 s dla 90°	30 s dla 90°
operating temperature - range	-30 ... +50°C	-30 ... +50°C	-30 ... +55°C	-30 ... +55°C	-30 ... +55°C	-30 ... +55°C
noise level	~62 dB (A)	~62 dB (A)	~62 dB (A)	~62 dB (A)	~62 dB (A)	~62 dB (A)

» electrical diagram for the BE, BLE series actuator:



NOTE:

Engine operation control requires connection to a three-wire system.

The actuator rotation direction is changed by connecting supply voltage to the terminals no. 2 or no. 3, depending on the desired rotation direction.

NOTE: 24 V connection through a safety transformer.

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

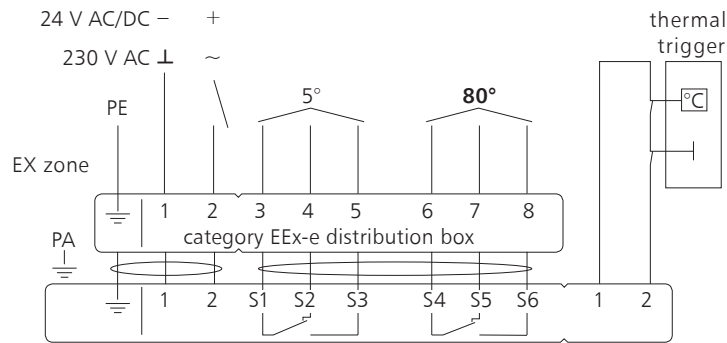
It is possible to connect further drives in parallel. Check the power consumption.

NOTE: Actuator limit switches positions are provided for the voltage-free position.

18.2.3 | Electric actuators without return springs

Specifications	EXBF B 001 2 ...0 N 000	EXBF A 001 2 ...0 N 000
zone	1, 2, 21, 22	
ATEX classification	II 2 GD EEx d IIC T6	
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	7 W	8 W
- for holding	2 W	3 W
sizing (apparent power)	10 VA	11 VA
ingress protection rating	IP 66	IP 66
auxiliary circuit breaker:	2 x SPDT 6 A (3) max. 250 V AC	2 x SPDT 6 A (3) max. 250 V AC
- activation point	5°, 80°	5°, 80°
torque:		
- motor	18 Nm	18 Nm
- return spring	12 Nm	12 Nm
operation time (90°C):		
- motor	150 s	18 Nm
- return spring	\sim 20 s	12 Nm
ambient temperature	-30 ... +50°C	-30 ... +50°C

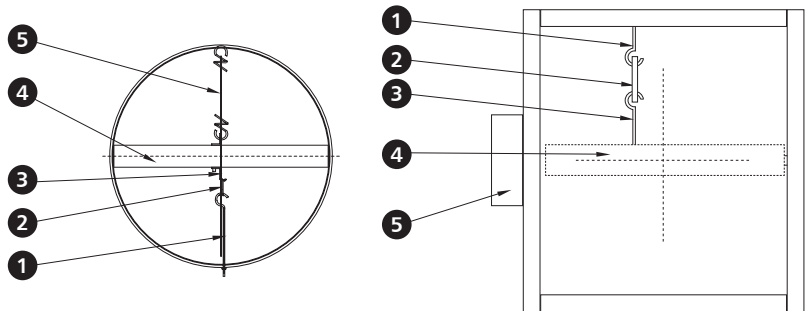
» connection diagram for the EXBF and EXBF...-T actuators:



18.3 | RST trigger and control mechanisms

In the RST version, the WK1 limit switches are installed inside the damper's casing as independent assemblies. The thermal trigger is located on the damper blade. A drive spring is installed on the damper blade or its casing in a protective box.

1. movable hook with nut
2. thermal trigger
3. thermal trigger
4. fixed hook on the damper blade
5. drive spring



» Independent damper limit switches - for the RST version

WK1 – limit switch (closed blade signal)
 WK2 – limit switch (open/closed blade signal)

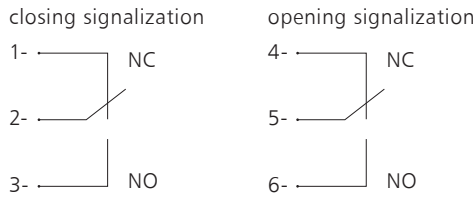
» Switch technical data

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

» Independent damper limit switches - for the RST version

WK1 – limit switch (closed blade signal)
 WK2 – limit switch (open/closed blade signal)

» electric diagram for the WK1 and WK2 limit switches



NOTE:

When closing the blade, the damper closing signalization switch is operated (terminal 2-3 is closed).

18.4 | RST-KW1 mechanisms

Specifications	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 - release switch	–	–	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			
operation time	max. 2 s					
mechanism operation control (closing)	-	-	voltage supply "impulse"	voltage disconnection "break"	voltage supply "impulse"	voltage disconnection "break"
mechanism operation control (opening)	manually	manually	manually	manually	manually	manually
impulse duration	max. 1 s					

» electrical collections description

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



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