mcr FID S/S p/P
mcr FID S/S p/O

single-blade cut-off fire dampers for comfort ventilation systems

PRODUCT CONFIGURATOR AT WWW.MERCOR.COM.PL

1396-CPR-0103

1488-CPR-0422/W

ATEST HIGIENICZNY

CERTYFIKACJA PRODUKTU

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

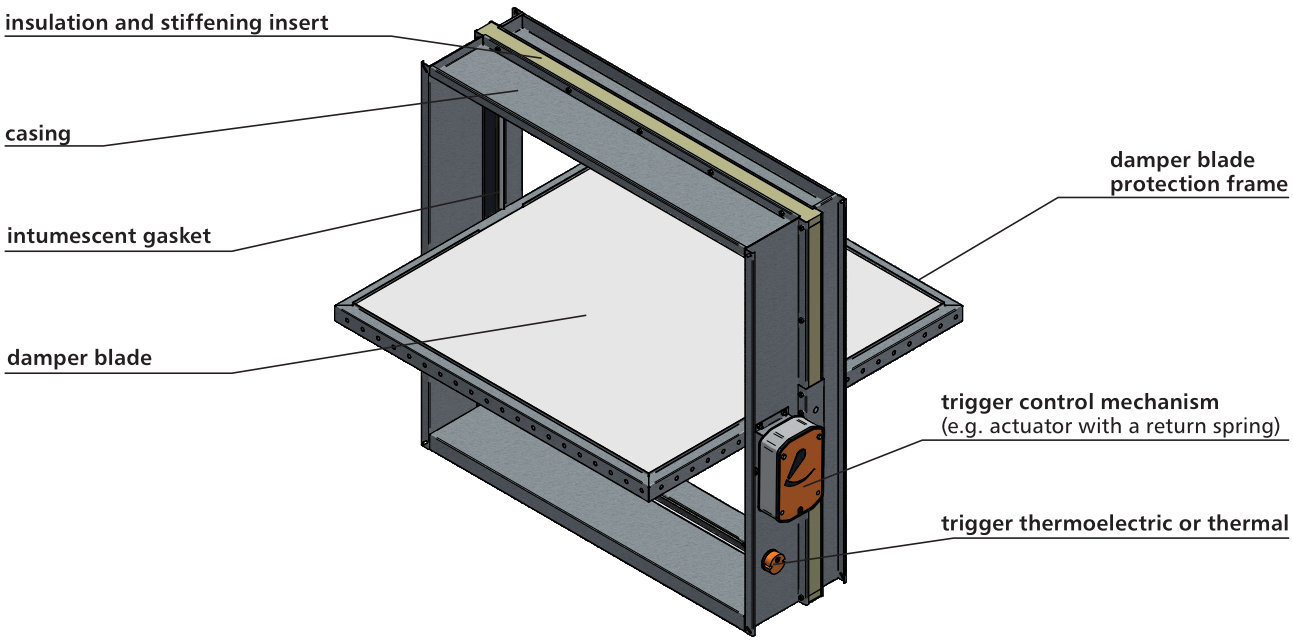
2.1. application

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

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

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

2.2. design



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

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

2.3. versions

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

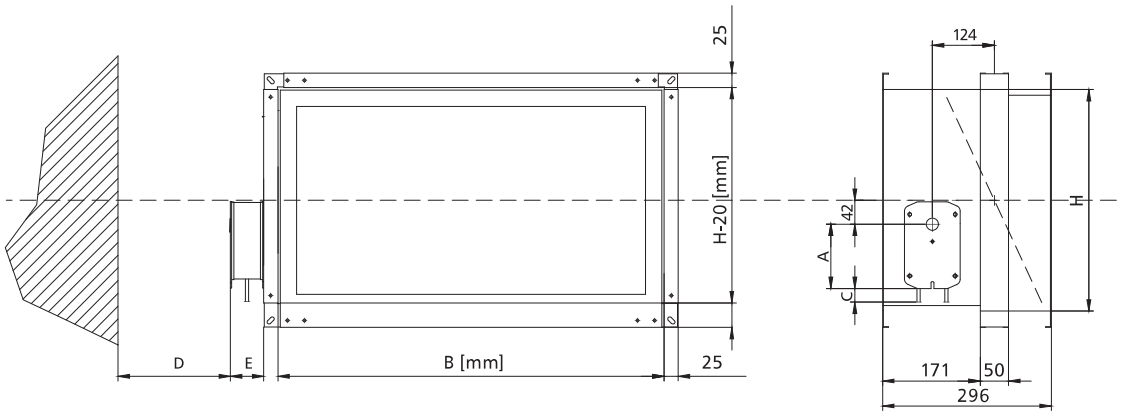
During normal operation, the damper blade of the fire damper remains open. In case of fire, the blade closes automatically or remotely when the power supply is cut off.

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

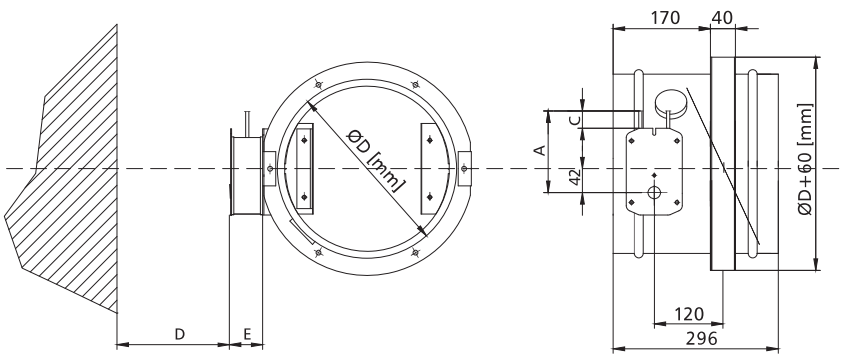
BF, BFL, BFN, BF-TL, EXBF series actuators are equipped with limit switches used to monitor the blade position. Furthermore, the mechanical position indicator is placed on the actuator.

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

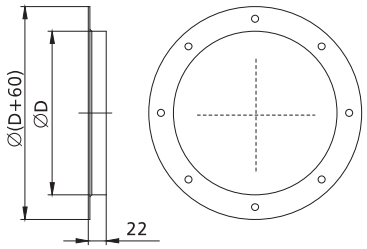
Dampers with Belimo actuators: analogue BF, BFL, BFN, digital BF-TL, EXBF explosion proof actuators close thanks to thermoelectric trigger tripping or power supply cut-off as a result of the actuator return spring action. The dampers open when the power supply voltage is applied to the actuator terminals.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



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



mounting flange

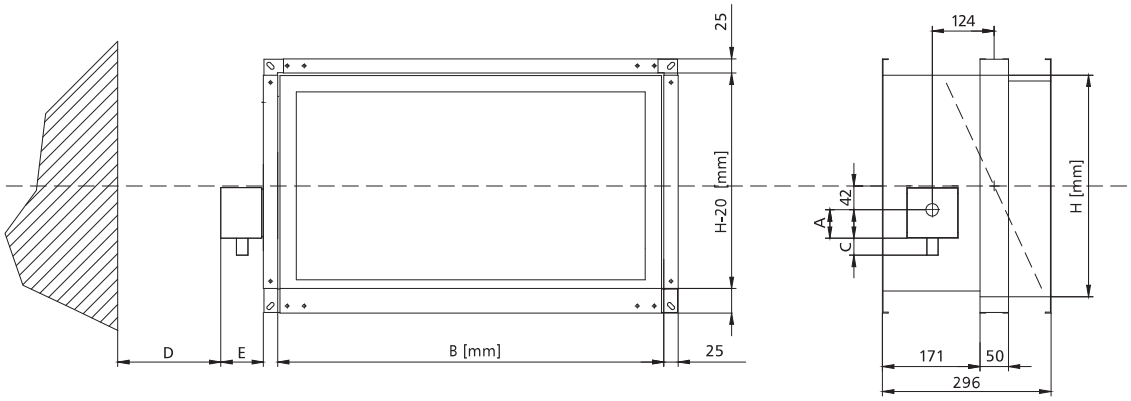


mechanism	A	C	D	E
BFN	157	30	75	42
BFL	138	30	75	38
BF24TL-ST	198	10	75	50
EXBF	225	55	75	160
BF	198	10	75	50

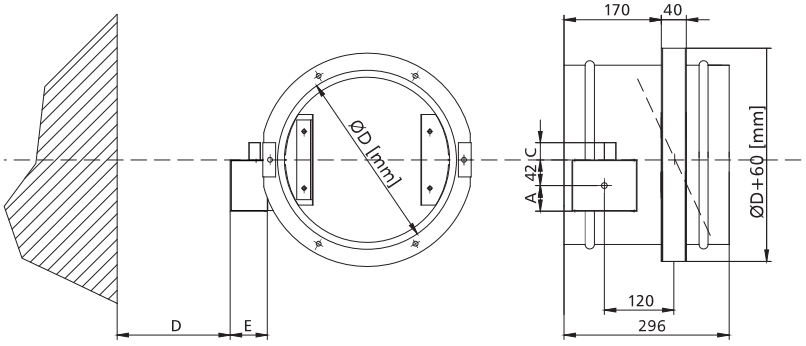
2.3.2. mcr FID S/S – the cut-off fire damper for ventilation ducts with a spring drive and thermal trigger

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

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



mechanism	A	C	D	E
RST	50	30	75	75

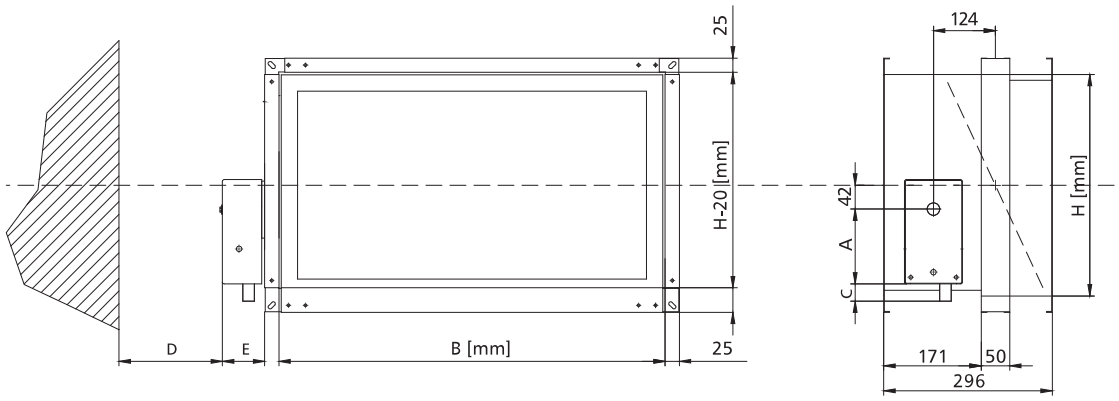


mechanism	A	C	D	E
RST	40	30	75	55

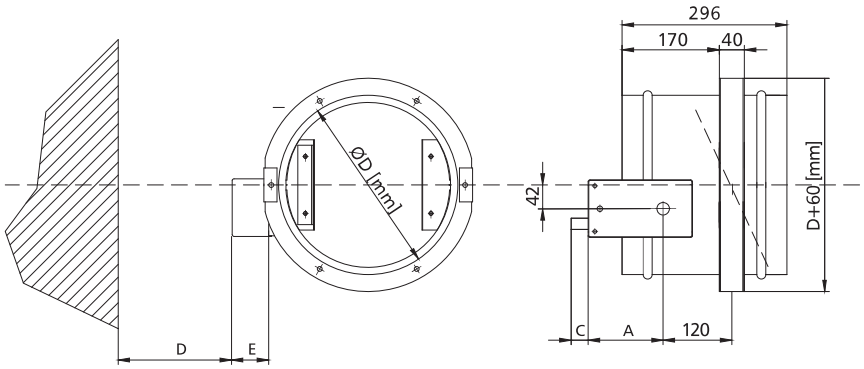
2.3.3. mcr FID S/S – the cut-off fire damper for ventilation ducts with a spring drive and an integrated thermal trigger, optionally equipped with an electromagnetic trigger and limit switches

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

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



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



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

2.4. dimensions

Rectangular dampers:

- nominal width B: from 200 mm to 1500 mm
- nominal height H: from 200 mm to 1500 mm
- the maximum cross-section surface of one damper: up to 1.8 m^2

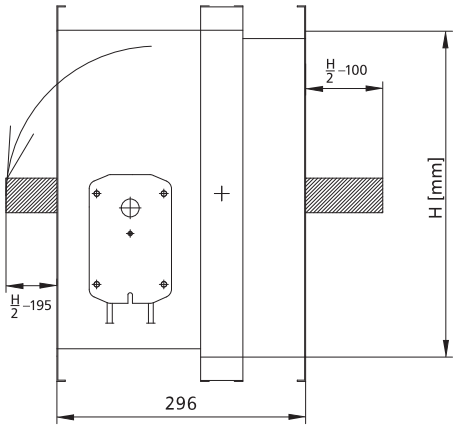
Apart from the standard dimensions, fire dampers can be manufactured with intermediate dimensions (in 1 mm increments, in the given range).

Circular dampers:

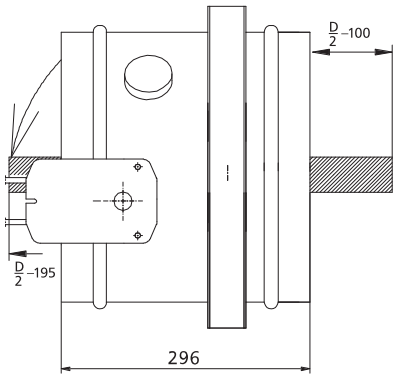
- nominal diameter D from 125 mm to 630 mm

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

mcr FID S/S p/P damper



mcr FID S/S p/O damper



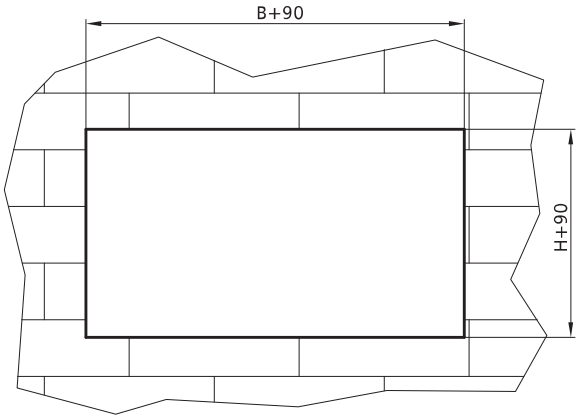
2.5. installation

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

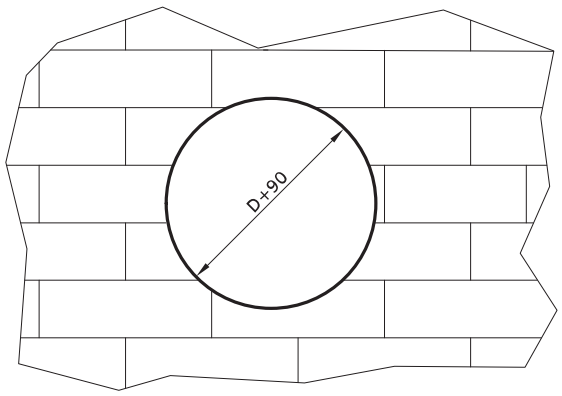
The mcr FID S/S p/O circular dampers are EI120(ve ho i↔o)-rated when installed in concrete partitions made of full bricks or cellular concrete blocks with the thickness of at least 110 mm, lightweight walls of cardboard-plaster panels on a steel framework with the thickness of at least 125 mm and the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

2.5.1. preparation of installation openings

mcr FID S/S p/P damper

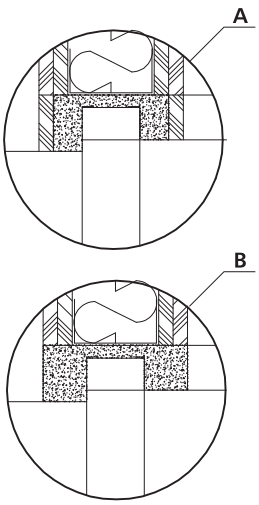


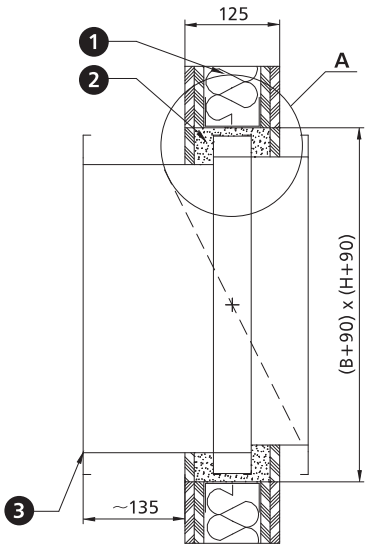
mcr FID S/S p/O damper

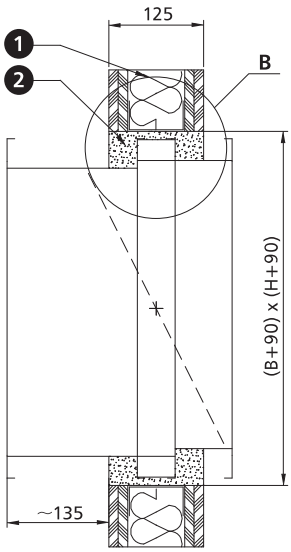


2.5.2. sample installation in lightweight walls of plaster-cardboard panels

mcr FID S/S p/P damper



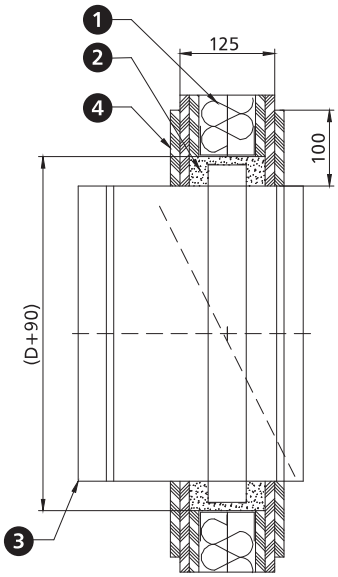




1. lightweight wall
2. sealing - plaster mortar*
3. fire damper mcr FID S

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

mcr FID S/S p/O damper

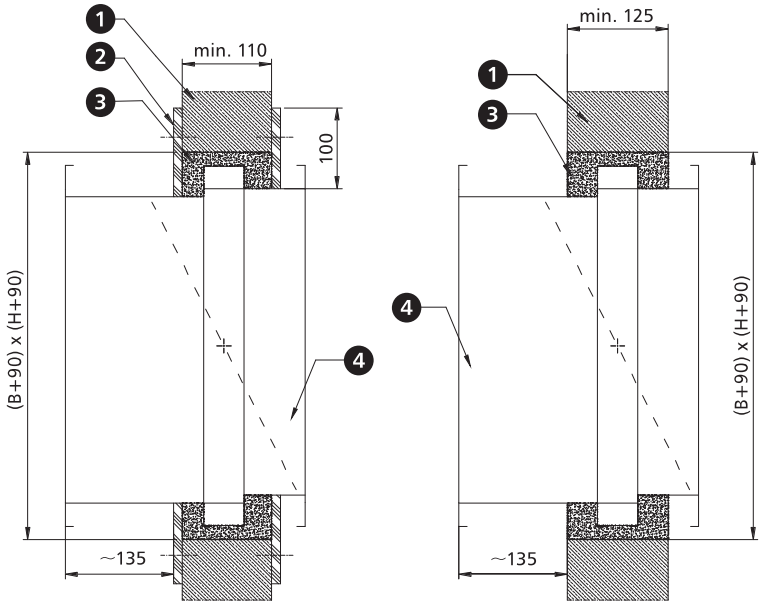


1. lightweight wall
2. sealing - plaster mortar*
3. fire damper mcr FID S
4. circumferential gypsum board trim

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

2.5.3. sample installation in concrete and masonry walls

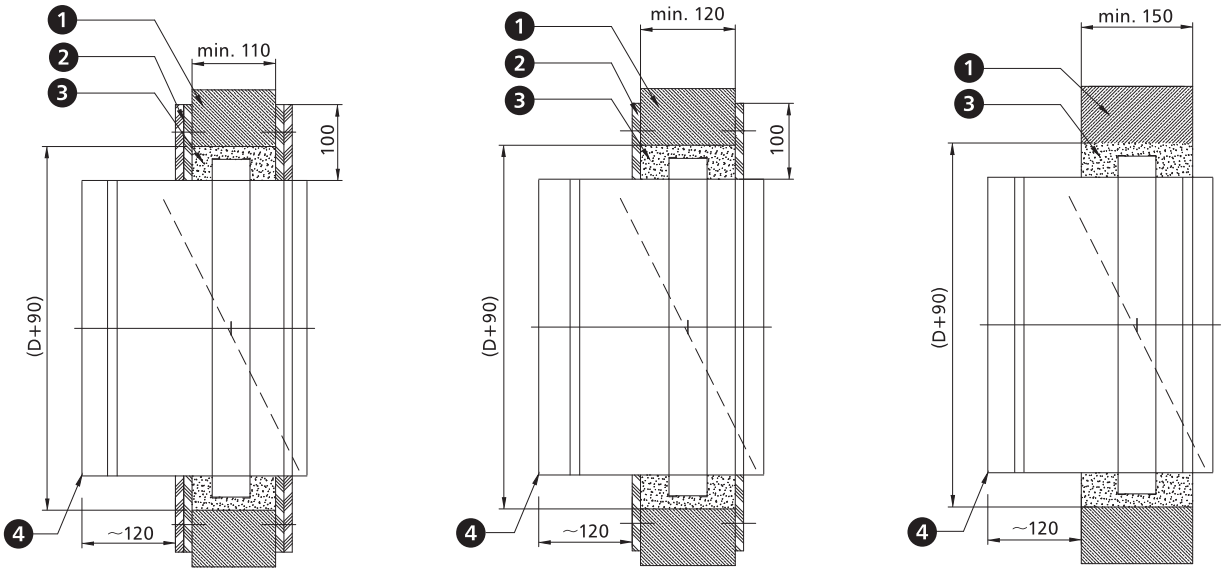
mcr FID S/S p/P damper



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

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

mcr FID S/S p/O damper

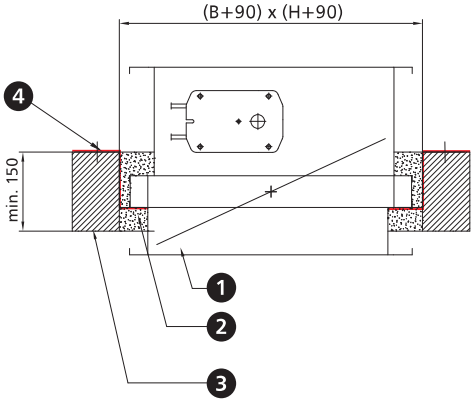


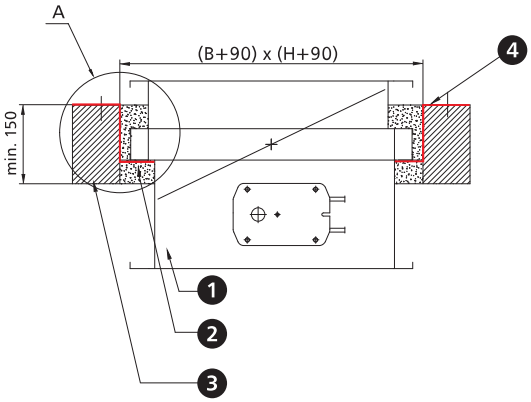
1. rigid wall - concrete, cellular concrete or bricks
2. circumferential gypsum board trim
3. sealing - concrete, cement or cement-lime masonry mortar*
4. fire damper mcr FID S

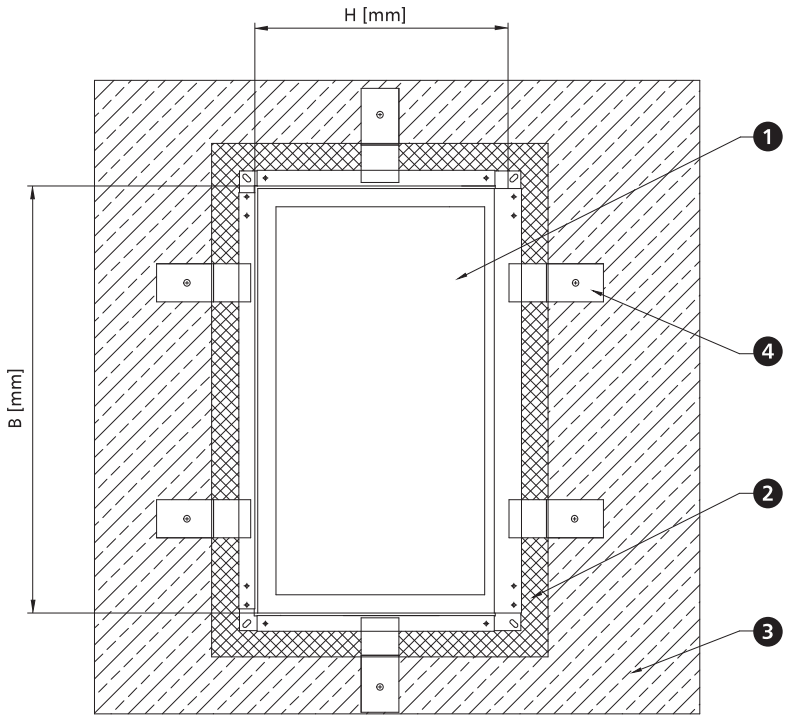
*it is possible to use a different sealing which ensures the required fire resistance

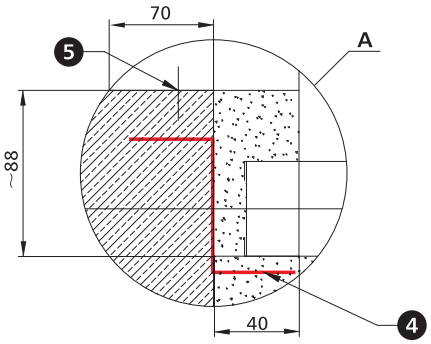
2.5.4. sample installation in ceilings

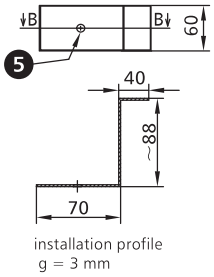
mcr FID S/S p/P damper









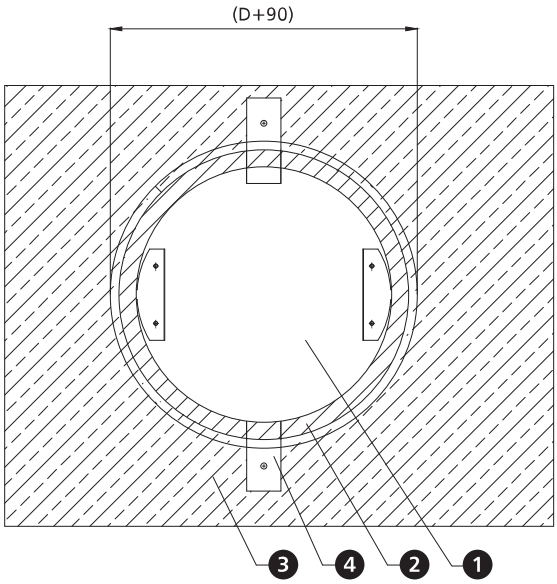


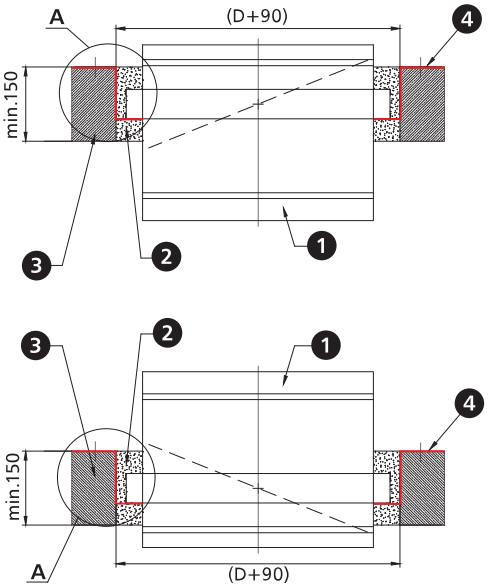
installation profile
g = 3 mm

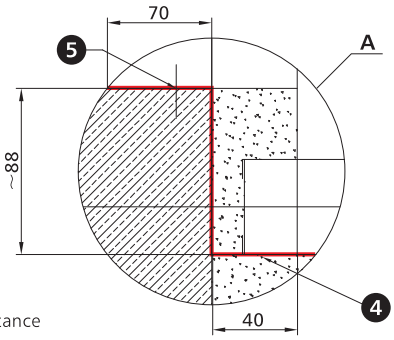
1. fire damper mcr FID S
2. sealing - concrete, cement or cement-lime masonry mortar*
3. ceiling
4. installation profile g = 3 mm
5. steel expansion plug

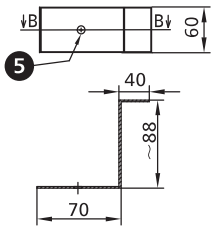
*it is possible to use a different sealing which ensures the required fire resistance

mcr FID S/S p/O damper







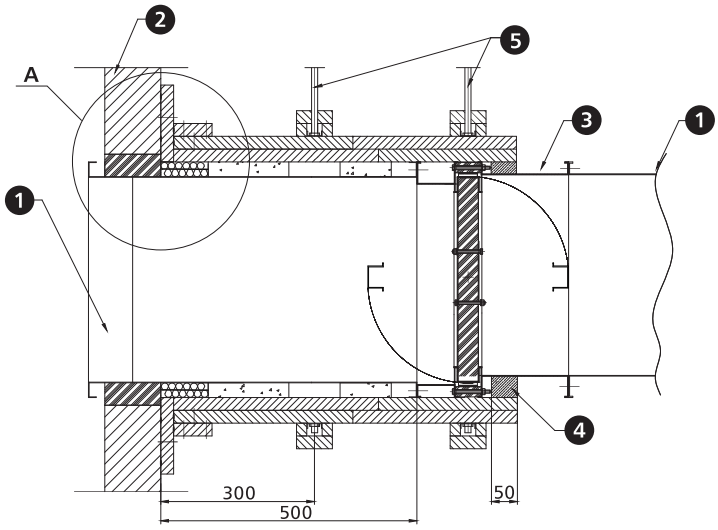


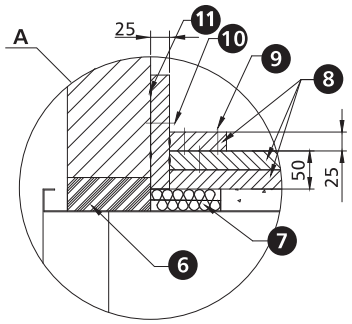
1. fire damper mcr FID S
2. sealing - concrete, cement or cement-lime masonry mortar*
3. ceiling
4. installation profile d = 3 mm
5. steel expansion plug

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

2.5.5. sample installation outside the fire partition

mcr FID S/S p/P damper



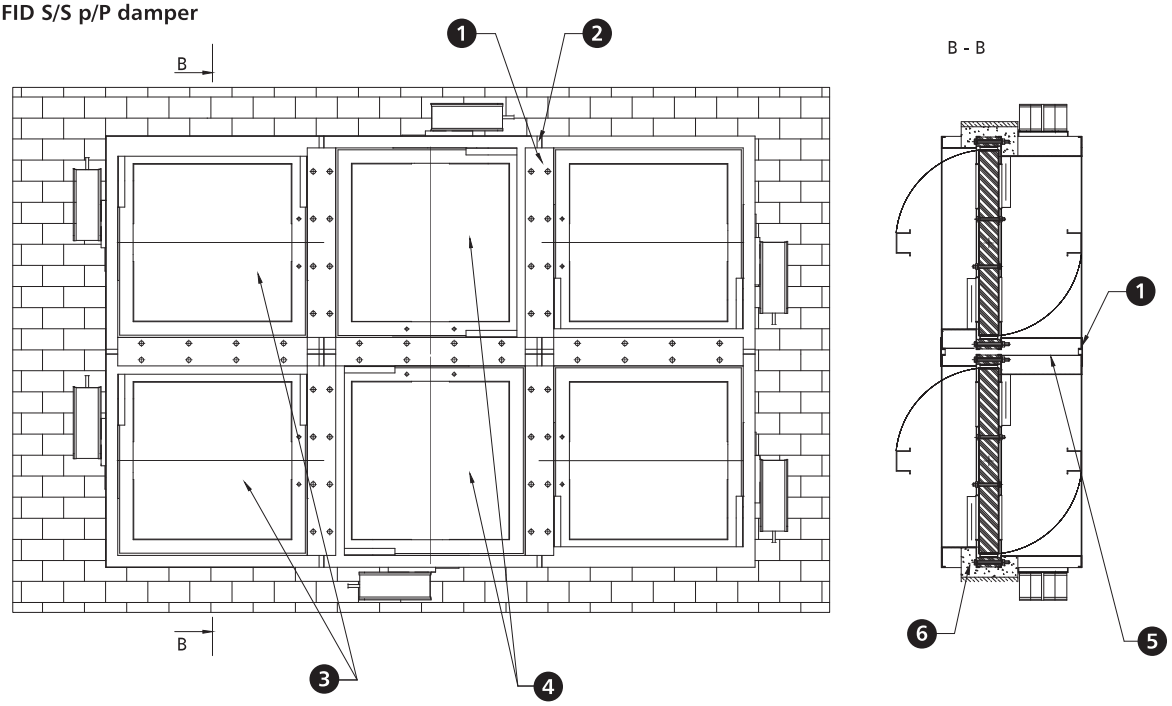


1. ventilation duct
2. rigid wall - concrete, cellular concrete or bricks
3. fire damper mcr FID S
4. gypsum filling
5. duct suspension
6. sealing (cement or cement-lime masonry mortar)*
7. mineral wool with the density of at least 80 kg/m^3, A1 class
8. Ridurit fire retardant board
9. screws 3.5 x 50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

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

2.5.6. sample installation in sets

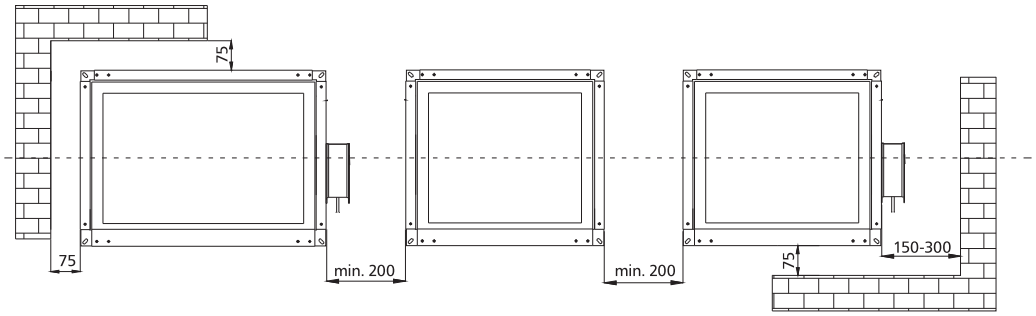
mcr FID S/S p/P damper



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

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

Distance between systems and partitions



Installation of the damper with a vertical axis of rotation

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

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

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

v – velocity [m/s]
Sk – duct cross-section [m^2]
Se – damper active cross-section [m^2]

Q – flow [m^3/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

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

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

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

v – velocity [m/s]
Sk – duct cross-section [m^2]
Se – damper active cross-section [m^2]

Q – flow [m^3/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

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

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

B – nominal width [mm]
H – nominal height [mm]
v – velocity [m/s]
Sk – duct cross-section [m^2]
Se – damper active cross-section [m^2]
Q – flow [m^3/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

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

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

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

v – velocity [m/s]
Sk – duct cross-section [m^2]
Se – damper active cross-section [m^2]

Q – flow [m^3/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

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

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

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

v – velocity [m/s]
Sk – duct cross-section [m^2]
Se – damper active cross-section [m^2]

Q – flow [m^3/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

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

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

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

v – velocity [m/s]
Sk – duct cross-section [m^2]
Se – damper active cross-section [m^2]

Q – flow [m^3/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

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

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

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

v – velocity [m/s]
Sk – duct cross-section [m^2]
Se – damper active cross-section [m^2]

Q – flow [m^3/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	v [m/s]	height H [mm] 1300 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]	1400 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]	1500 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]
200	4	0.260	0.249	3 588	4	30	0.280	0.269	3 876	4	29	0.300	0.289	4 164	4	29
	6			5 383	9	40			5 815	9	40			6 247	9	40
	8			7 177	17	48			7 753	16	47			8 329	15	47
	10			8 971	26	53			9 691	25	53			10 411	24	53
250	4	0.325	0.312	4 486	4	31	0.350	0.337	4 846	4	30	0.375	0.362	4 164	4	30
	6			6 728	9	41			7 268	9	40			6 247	8	40
	8			8 971	17	49			9 691	15	48			8 329	15	48
	10			11 214	26	54			12 114	24	54			10 411	23	53
300	4	0.390	0.374	5 383	4	31	0.420	0.404	5 815	4	31	0.450	0.434	6 247	4	30
	6			8 074	9	41			8 722	9	41			9 370	8	40
	8			10 765	16	49			11 629	15	49			12 493	14	48
	10			13 457	25	55			14 537	24	54			15 617	22	54
350	4	0.455	0.436	6 280	4	30	0.490	0.471	6 784	3	30	0.525	0.506	7 288	3	30
	6			9 420	8	41			10 176	8	40			10 932	8	40
	8			12 560	15	48			13 568	13	48			14 576	13	48
	10			15 700	23	54			16 960	21	53			18 220	21	54
400	4	0.520	0.498	7 177	3	29	0.560	0.538	7 753	3	29	0.600	0.578	8 329	3	30
	6			10 765	7	40			11 629	7	40			12 493	7	40
	8			14 354	13	47			15 506	13	48			16 658	13	48
	10			17 942	20	53			19 382	20	53			20 822	20	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	30
	6			12 111	7	40			13 083	7	40			14 055	7	40
	8			16 148	12	47			17 444	12	47			18 740	12	48
	10			20 185	19	53			21 805	19	53			23 425	19	53
500	4	0.650	0.623	8 971	3	29	0.700	0.673	9 691	3	30	0.750	0.723	10 411	3	30
	6			13 457	7	40			14 537	7	40			15 617	7	41
	8			17 942	12	48			19 382	12	48			20 822	12	48
	10			22 428	19	53			24 228	19	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	31
	6			14 802	7	40			15 990	7	41			17 178	7	41
	8			19 737	12	48			21 321	12	48			22 905	12	49
	10			24 671	19	54			26 651	19	54			28 631	19	54
600	4	0.780	0.748	10 765	3	29	0.840	0.808	11 629	3	29	0.900	0.868	12 493	3	29
	6			16 148	6	39			17 444	6	40			18 740	6	40
	8			21 531	11	47			23 259	11	47			24 987	11	48
	10			26 914	17	53			29 074	17	53			31 234	17	53
650	4	0.845	0.810	11 663	3	29	0.910	0.875	12 599	3	29	0.975	0.940	13 535	3	30
	6			17 494	6	40			18 898	6	40			20 302	6	40
	8			23 325	11	47			25 197	11	48			27 069	11	48
	10			29 156	17	53			31 496	17	53			33 836	17	54
700	4	0.910	0.872	12 560	2	28	0.980	0.942	13 568	2	28	1.050	1.012	14 576	2	28
	6			18 840	5	38			20 352	5	39			21 864	5	39
	8			25 119	10	46			27 135	10	46			29 151	10	47
	10			31 399	15	52			33 919	15	52			36 439	15	52
800	4	1.040	0.997	14 354	2	28	1.120	1.077	15 506	2	29	1.200	1.157	16 658	2	29
	6			21 531	5	39			23 259	5	39			24 987	5	40
	8			28 708	10	46			31 012	10	47			33 316	10	47
	10			35 885	15	52			38 765	15	53			41 645	15	53
900	4	1.170	1.121	16 148	2	29	1.260	1.211	17 444	2	29	1.350	1.301	18 740	2	30
	6			24 222	5	39			26 166	5	40			28 110	5	40
	8			32 296	10	47			34 888	10	47			37 480	10	48
	10			40 370	15	53			43 610	15	53			46 850	15	53
1000	4	1.300	1.246	17 942	2	28	1.400	1.346	19 382	2	28	1.500	1.446	20 822	2	28
	6			26 914	5	39			29 074	5	38			31 234	5	39
	8			35 885	9	47			38 765	8	46			41 645	8	46
	10			44 856	14	52			48 456	13	52			52 056	13	52
1100	4	1.430	1.371	19 737	2	29	1.540	1.481	21 321	2	27	1.650	1.591	22 905	2	26
	6			29 605	5	39			31 981	4	38			34 357	4	37
	8			39 473	9	47			42 641	8	45			45 809	7	44
	10			49 342	14	53			53 302	12	51			57 262	11	50
1200	4	1.560	1.495	21 531	2	28	1.680	1.615	23 259	2	28	1.800	1.735	24 987	2	26
	6			32 296	5	39			34 888	4	38			37 480	4	36
	8			43 062	8	46			46 518	8	46			49 974	6	44
	10			53 827	13	52			58 147	12	51			62 467	10	49
1300	4	1.690	1.620	23 325	2	28	1.820	1.750	25 197	2	27					
	6			34 988	4	38			37 796	4	37					
	8			46 650	8	46			50 394	7	45					
	10			58 313	12	51			62 993	11	51					
1400	4	1.820	1.744	25 119	2	28										
	6			37 679	4	39										
	8			50 239	8	46										
	10			62 798	12	52										

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

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

D – nominal diameter [mm]

v – velocity [m/s]
Sk – duct cross-section [m^2]
Se – damper active cross-section [m^2]

Q – flow [m^3/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

D [mm]	v [m/s]	Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]
250	2	0.0491	0.0392	281	1	15
	4			560	4	24
	6			890	8	28
	8			1130	11	33
315	2	0.0779	0.0653	478	1	18
	4			949	4	24
	6			1400	8	30
	8			1880	16	35
355	2	0.0989	0.0847	610	1	17
	4			1 220	5	24
	6			1 830	11	34
	8			2 440	20	40
400	2	0.1256	0.1096	789	1	17
	4			1 578	5	25
	6			2 367	11	34
	8			3 156	10	41

D [mm]	v [m/s]	Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]
450	2	0.1590	0.1410	1 015	1	16
	4			2 030	4	25
	6			3 045	10	35
	8			4 060	18	41
500	2	0.1963	0.1763	1 269	1	18
	4			2 538	4	24
	6			3 807	8	33
	8			5 076	15	40
560	2	0.2462	0.2238	1 611	1	16
	4			3 222	3	24
	6			4 834	7	33
	8			6 445	13	39
630	2	0.3116	0.2864	2 062	1	20
	4			4 124	2	22
	6			6 186	5	33
	8			8 247	9	40

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

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

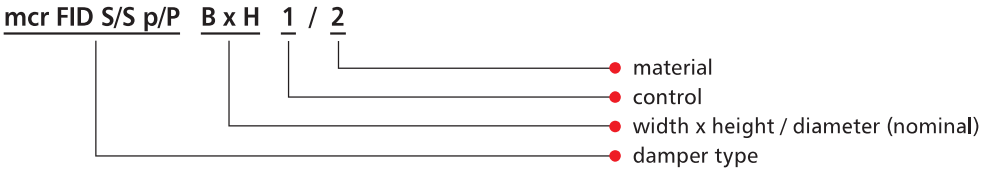
height H [mm] \ width B [mm]	200	250	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
200	9.5	9.7	10	10	15	17	17.5	19	22	25	28	30	33	39	45
250	9.5	10	11	11	16	17.5	18	21	24	27	29	32	34	45	48
300	10	11	11	12	17	20	21	23	26	28	31	34	38	50	51
350	11	11	11	16	18	20.5	23	26	28	29	33	35	36	52	53
400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

For dampers with no actuator, subtract ~1 kg.

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

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

2.8. marking



1 – control:

– RST trigger control mechanism
RST – thermal trigger
RST/WK1 – thermal trigger + limit switch (closed blade signal)
RST/WK2 – thermal trigger + limit switch (open/closed blade signal)

– RST-KW1 trigger control mechanism
RST-KW1/S – thermal trigger
RST-KW1/S/WK2 – thermal trigger + limit switch (open/closed blade signal)
RST-KW1/24I – thermal trigger + „pulse" electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
RST-KW1/24P – thermal trigger + „break" electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
RST-KW1/230I – thermal trigger + „pulse" electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
RST-KW1/230P – thermal trigger + „break" electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)

– Belimo trigger control mechanism
BF24-T – actuator with a return spring, U = 24 V AC/DC
BF230-T – actuator with a return spring, U = 230 V AC
BF24TL-T-ST (with the BKN230-24MP option) – actuator with a return spring, U = 24 V, MP Bus digital control
EXBF24-T – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
EXBF230-T – explosion proof actuator with a return spring in the Ex version, U = 230 V AC
BF24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
BFL24-T – actuator with a return spring, U = 24 V AC/DC
BFL230-T – actuator with a return spring, U = 230 V AC
BFL24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
BFN24-T – actuator with a return spring, U = 24 V AC/DC
BFN230-T – actuator with a return spring, U = 230 V AC
BFN24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system

2 – material

[no symbol] – galvanised steel, Zn 275 g/m^2 coating

KN – 1.4404 acid-proof stainless steel

example marking:

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

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

mcr FID S/S p/O Ø400 RST / WK2

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

Chapter 12 - power supply and control (p. 141) contains:
- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper,
- location of trigger control mechanisms in relation to the damper - manufacture standards.