

Maintenance-free

EK90 smoke control dampers
meet all requirements in accordance with European
standards and are universal for all applications.

Further uses and extended fire classification

EI 90 (v_{edw} - h_{odw} - i ↔ o) S1500 C_{mod} HOT400/30 MA multi

EK90 smoke control dampers

Application examples for smoke extraction and for ventilation, as required, in the form of "combi-dampers"



- | | |
|---|---|
| A Closed smoke control damper | 1 Smoke control damper in an air intake |
| B Opened smoke control damper | 2 Smoke control damper suspended underneath ceilings |
| C Ventilator for smoke extraction and also for ventilation | 3 Smoke control damper in a shaft wall |
| D Smoke extraction duct with fire resistance period | 4 Smoke control damper in a vertical smoke extraction duct |
| E Smoke extraction duct without fire resistance period | 5 Smoke control damper in a horizontal smoke extraction duct |

EK90 smoke control dampers

Description, properties, sizes

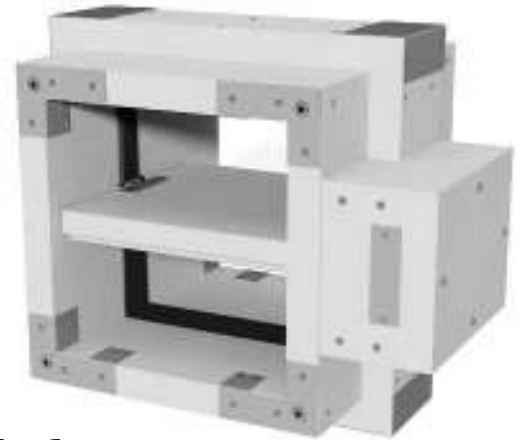
Maintenance-free

EK90 smoke control dampers EN 12101-8 – Series EK92 –

With casing and damper blades made from abrasion-proof, safe, corrosion-resistant calcium silicate that is suitable for higher temperatures. The edge protection profiles are made from galvanized steel and include connection holes.

Opening and closing is carried out by means of stainless steel shafts using electric motor drives for 24 V AC/DC or 230 V AC even when the fan is running and at inflow velocities of up to 20 m/s.

Special seals without any additional stops allow for large free cross-sections and thus extremely low pressure drops and sound power levels.



Declaration of performance DoP no. CPR/EK90/003

German approval Z 56.4212 – 1007

Environmental Product Declaration according to ISO 14025 and EN 15804 EPD-WIL-20160047-ICC1-DE

Casing leak tightness class C according to EN 1751

Widths B: 200 mm to 1500 mm

Heights H: 200 mm to 800 mm

Lengths L: 350 mm to 850 mm

All dimensions are available in 5-mm increments!

Fire classification

EI 90 (v_{edw} - h_{odw} - $i \leftrightarrow o$) **S1500 C_{mod} HOT400/30 MA multi**

- **EI90** Fire resistance period of 90 minutes

Installation:

v_{ed} in and on horizontal smoke extraction ducts.

h_{od} in and on vertical smoke extraction ducts.

v_{ew} in rigid walls and in flexible walls.

h_{ow} in rigid ceilings.

$i \leftrightarrow o$ Fire exposure has been verified on both sides.

- **S1500** For smoke extraction systems with operating pressures between 1500 Pa negative pressure and 500 Pa overpressure (pressure class 3). Smokeproof at up to 1500 Pa differential pressure.
- **C_{mod}** For systems designed only for smoke extraction and also for combined ventilation systems that was as heating, ventilation and air conditioning systems. Intermediate damper blade positions for volume flow adjustment are permitted (modulation mode).
The service life is verified by 20,000 weight-loaded cycles.
- **HOT** The smoke control dampers close and open again at least after 30 minutes of fire exposure at 400°C.
- **MA** Closed smoke control dampers can be opened after 25 minutes of full exposure to fire (> 800°C).
- **multi** The smoke control dampers may be used between fire compartments (multi) and in individual areas (single).

Installation with horizontal or vertical damper blade:

- in rigid walls and ceilings, ≥ 100 mm thick and ≥ 450 kg/m³ bulk density. Wet installation with mortar or a dry installation with mineral wool ≥ 100 kg/m³ are possible.
- in metal stud walls, ≥ 95 mm thick, with or without mineral wool ≤ 100 kg/m³ inside.
- on and between horizontal or vertical smoke extraction ducts.

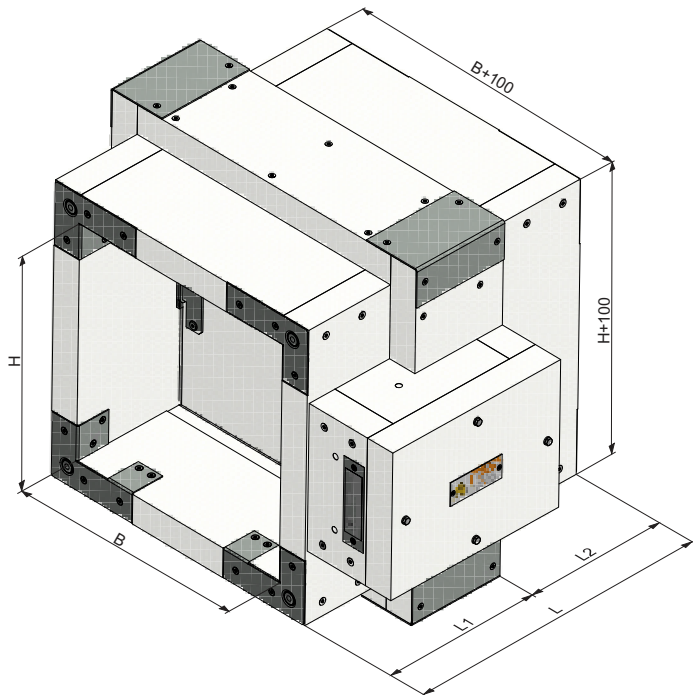
Can be connected:

- in single or double-sided arrangement on smoke extraction ducts with fire resistance period,
- in single-sided arrangement on smoke extraction ducts without fire resistance period,
- in single or double-sided arrangement on protective grille

⇒ see also page 34

EK90 smoke control dampers

Data sheet



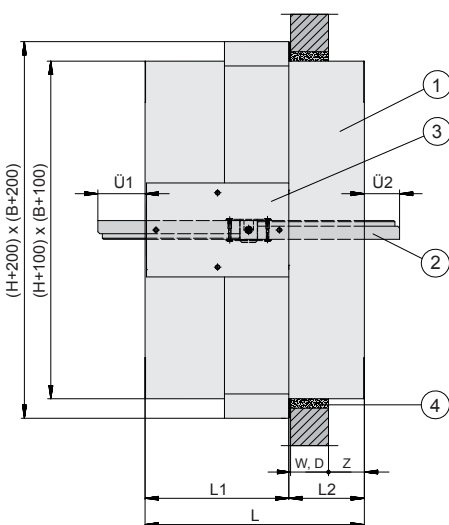
Calculating damper blade excess lengths:

- $\dot{U}1 = \frac{1}{2} \cdot H - L1 + 105 \text{ mm}$; $\dot{U}2 = \frac{1}{2} \cdot H - L2 - 107 \text{ mm}$
- If $\dot{U}1 \leq 0$ or $\dot{U}2 \leq 0$, there is no damper blade excess length!

If protective grilles are mounted directly on the casings, then $\dot{U}1$ or $\dot{U}2$ should be at least -20 mm, which equates to a 20-mm freedom of movement. Hence, $L1 \geq \frac{1}{2} \cdot H + 125 \text{ mm}$ and $L2 \geq \frac{1}{2} \cdot H - 87 \text{ mm}$ should be applied!

$L2 \geq W(D) + Z$ is also necessary! Here, **W** = thickness of the wall, **D** = thickness of the ceiling. **Z** is the necessary casing excess length.

- Examples:
- Fitting of shear protection brackets A. \Rightarrow see page 19
 - Connection of smoke extraction ducts. \Rightarrow see page 23



- 1 Casing
- 2 Damper blade
- 3 Protective casing with opening for motor drive cover

Standard widths B [mm]

200 - 225 - 250 - 275 - 300 - 325 - 350 - 375 - 400 - 450
500 - 550 - 600 - 650 - 700 - 750 - 800 - 850 - 900 - 950
1000 - 1050 - 1100 - 1150 - 1200 - 1250 - 1300 - 1400 - 1500

Standard heights H [mm]

200 - 225 - 250 - 275 - 300 - 325 - 350 - 375 - 400 - 450
500 - 550 - 600 - 650 - 700 - 750 - 800

Standard lengths [mm]

for heights H	Length L	Length L1	Length L2
up to 450 mm:	500 mm	330 mm	170 mm
larger than 450 mm:	550 mm	380 mm	170 mm

Smallest lengths for lateral mounting on smoke extraction ducts

for heights H	Length L	Length L1	Length L2
up to 450 mm:	350 mm	330 mm	20 mm
larger than 450 mm:	400 mm	380 mm	20 mm

Standard lengths of special electrical connection design

for all heights H	Length L	Length L1	Length L2
200 to 800 mm:	550 mm	380 mm	170 mm

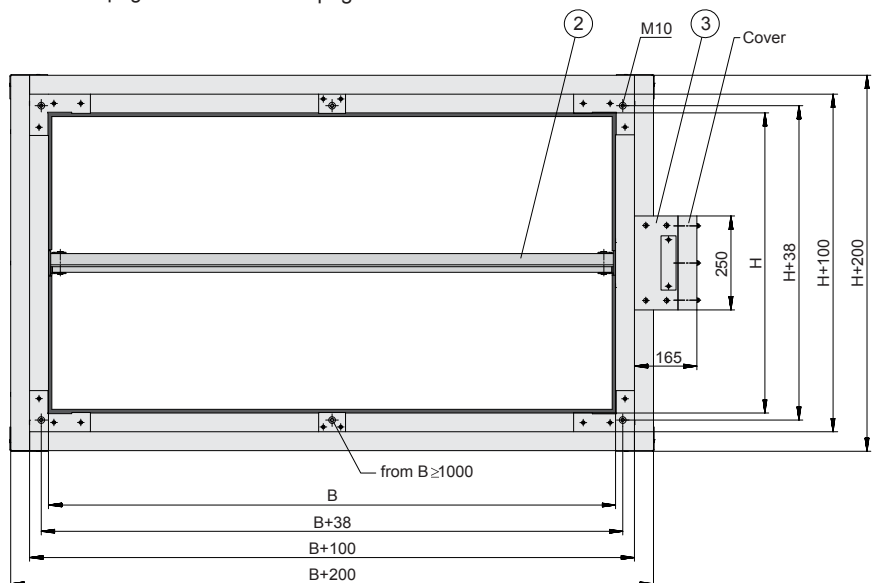
Smallest lengths for lateral mounting on smoke extraction ducts

for all heights H	Length L	Length L1	Length L2
200 to 800 mm	400 mm	380 mm	20 mm

Intermediate dimensions for B, H, L, L1 and L2 are available in 5 mm increments. L is always = L1 + L2.

Lengths for double-sided mounting of protective grilles

\Rightarrow see page 34



All dimensions in mm

4 Installation gap filled with mortar or mineral wool $\geq 100 \text{ kg/m}^3$

W: Wall thickness / **D:** Ceiling thickness / **Z:** Casing excess length

EK90 smoke control dampers

Pressure drop coefficients ζ / nomenclature

H	B = 200	225	250	275	300	325	350	375	400	450	500	550	600	650	700
200	1.118	1.071	1.035	1.006	0.983	0.964	0.948	0.934	0.922	0.902	0.887	0.875	0.864	0.856	0.849
225	0.908	0.868	0.837	0.812	0.792	0.775	0.761	0.749	0.739	0.722	0.709	0.698	0.689	0.682	0.676
250	0.768	0.732	0.704	0.682	0.664	0.649	0.637	0.626	0.617	0.602	0.590	0.581	0.573	0.566	0.561
275	0.669	0.636	0.610	0.590	0.574	0.560	0.549	0.539	0.531	0.517	0.506	0.497	0.490	0.484	0.479
300	0.595	0.564	0.540	0.521	0.506	0.494	0.483	0.474	0.466	0.453	0.443	0.435	0.429	0.423	0.418
325	0.537	0.508	0.486	0.469	0.454	0.442	0.432	0.424	0.417	0.405	0.395	0.388	0.381	0.376	0.372
350	0.492	0.464	0.443	0.427	0.413	0.402	0.392	0.384	0.377	0.366	0.357	0.350	0.344	0.339	0.335
375	0.455	0.429	0.409	0.393	0.380	0.369	0.360	0.352	0.345	0.335	0.326	0.319	0.314	0.309	0.305
400	0.425	0.399	0.380	0.365	0.352	0.342	0.333	0.326	0.319	0.309	0.300	0.294	0.288	0.284	0.280
450	0.377	0.354	0.335	0.321	0.309	0.299	0.291	0.284	0.278	0.269	0.261	0.255	0.250	0.245	0.242
500	0.342	0.320	0.302	0.289	0.277	0.268	0.260	0.254	0.248	0.239	0.231	0.226	0.221	0.217	0.213
550	0.315	0.294	0.277	0.264	0.253	0.244	0.237	0.230	0.225	0.216	0.209	0.203	0.199	0.195	0.191
600	0.294	0.273	0.257	0.244	0.234	0.225	0.218	0.212	0.207	0.198	0.191	0.186	0.181	0.177	0.174
650	0.277	0.256	0.240	0.228	0.218	0.210	0.203	0.197	0.192	0.183	0.177	0.171	0.167	0.163	0.160
700	0.262	0.242	0.227	0.215	0.205	0.197	0.190	0.184	0.179	0.171	0.165	0.160	0.155	0.152	0.149
750	0.250	0.231	0.216	0.204	0.194	0.186	0.180	0.174	0.169	0.161	0.155	0.150	0.145	0.142	0.139
800	0.240	0.221	0.206	0.194	0.185	0.177	0.171	0.165	0.160	0.152	0.146	0.141	0.137	0.134	0.131

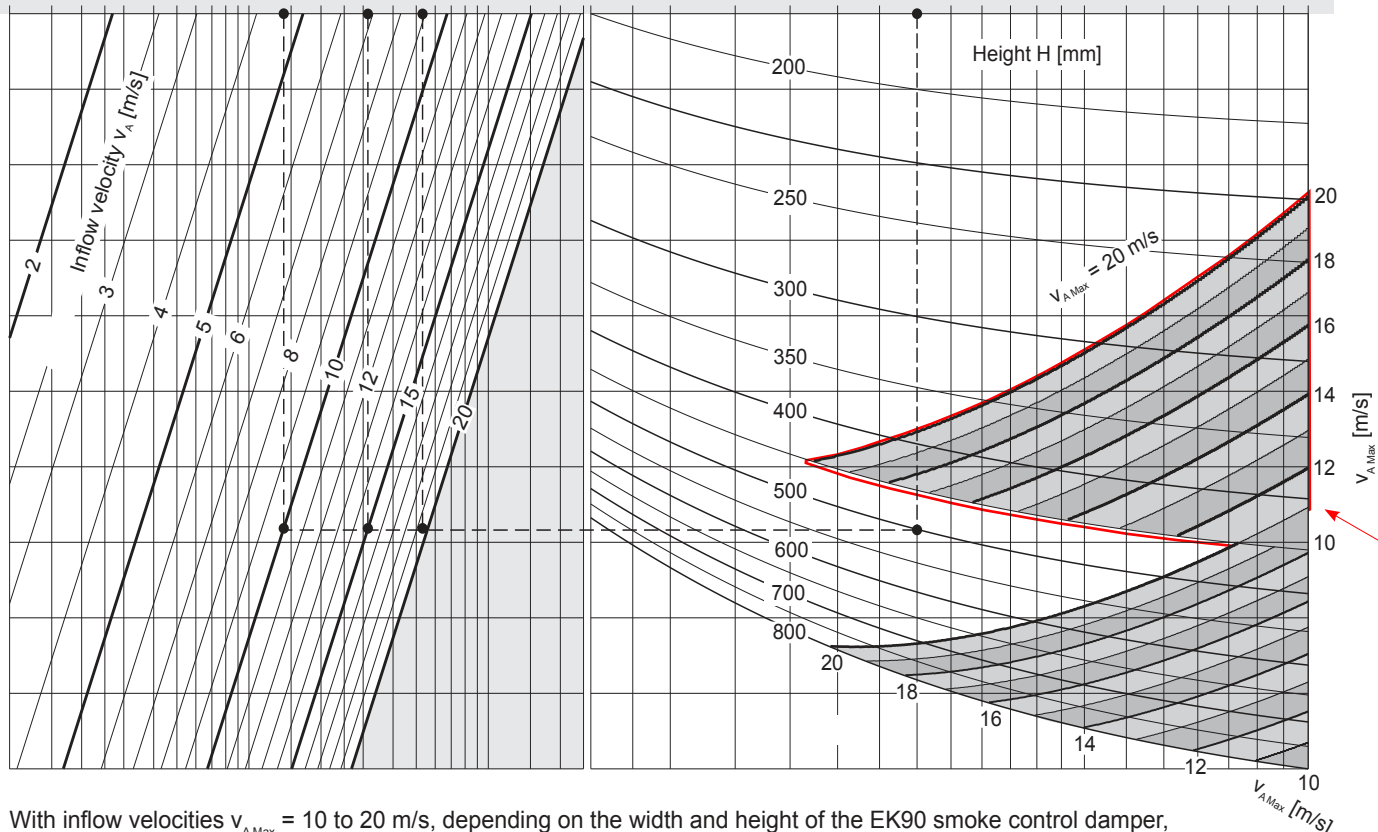
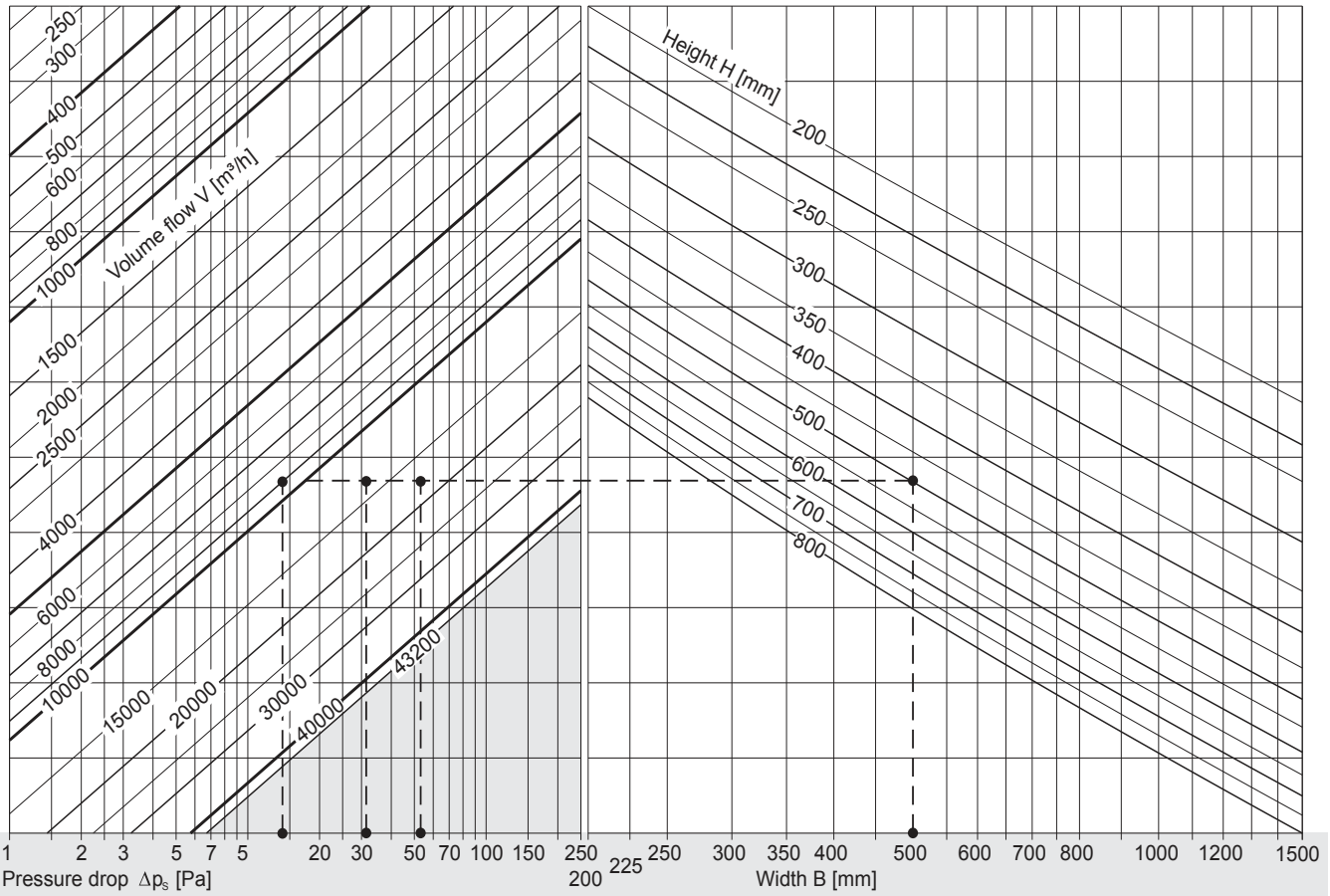
H	B = 750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1400	1500
200	0.842	0.837	0.832	0.828	0.824	0.821	0.818	0.815	0.812	0.810	0.808	0.806	0.803	0.800
225	0.670	0.666	0.662	0.658	0.655	0.652	0.649	0.647	0.645	0.643	0.641	0.639	0.636	0.634
250	0.556	0.552	0.548	0.545	0.542	0.539	0.537	0.535	0.533	0.531	0.530	0.528	0.525	0.523
275	0.475	0.471	0.467	0.464	0.462	0.459	0.457	0.455	0.454	0.452	0.451	0.449	0.447	0.445
300	0.414	0.411	0.408	0.405	0.402	0.400	0.398	0.397	0.395	0.393	0.392	0.391	0.389	0.387
325	0.368	0.365	0.362	0.359	0.357	0.355	0.353	0.351	0.350	0.348	0.347	0.346	0.344	0.342
350	0.331	0.328	0.325	0.323	0.321	0.319	0.317	0.315	0.314	0.312	0.311	0.310	0.308	0.306
375	0.301	0.298	0.296	0.293	0.291	0.289	0.288	0.286	0.285	0.284	0.282	0.281	0.279	0.278
400	0.277	0.274	0.271	0.269	0.267	0.265	0.264	0.262	0.261	0.260	0.259	0.257	0.256	0.254
450	0.239	0.236	0.233	0.231	0.229	0.228	0.226	0.225	0.224	0.223	0.221	0.221	0.219	0.217
500	0.210	0.208	0.205	0.203	0.202	0.200	0.199	0.197	0.196	0.195	0.194	0.193	0.192	0.190
550	0.189	0.186	0.184	0.182	0.180	0.179	0.178	0.176	0.175	0.174	0.173	0.172	0.171	0.169
600	0.172	0.169	0.167	0.165	0.164	0.162	0.161	0.160	0.158	0.157	0.157	0.156	0.154	0.153
650	0.158	0.155	0.153	0.151	0.150	0.148	0.147	0.146	0.145	0.144	0.143	0.142	0.141	0.140
700	0.146	0.144	0.142	0.140	0.139	0.137	0.136	0.135	0.134	0.133	0.132	0.131	0.130	0.129
750	0.137	0.134	0.132	0.131	0.129	0.128	0.127	0.125	0.124	0.123	0.123	0.122	0.120	0.119
800	0.128	0.126	0.124	0.123	0.121	0.120	0.119	0.117	0.116	0.116	0.115	0.114	0.113	0.111

Nomenclature

B	[mm]	Clear width of the smoke control damper	ζ	Pressure drop coefficient
H	[mm]	Clear height of the smoke control damper	Δp_s	[Pa] Pressure drop with smoke control damper fully open
A_A	[m ²]	Inflow cross-section $A_A = B [m] \cdot H [m]$		$\Delta p_s [Pa] = \frac{1}{2} \cdot 1.2 [kg/m^3] \cdot \zeta \cdot v_A [m/s]^2$
A_{free}	[m ²]	Free cross-section \Rightarrow see table on page 16	L_{WA}	[dB(A)] A-weighted sound power level (area-corrected)
v_0	[m/s]	Flow velocity in A_{free}	L_{W-Oct}	[dB] Octave sound power level $L_{W-Oct} = L_{WA} + \Delta L$
v_A	[m/s]	Flow velocity in A_A	ΔL	[dB] Relative sound power level
		Inflow velocity	f	[Hz] Octave mid frequency
V	[m ³ /h]	Volume flow		

EK90 smoke control dampers

Volume flow V , pressure drop Δp , inflow velocity v_A

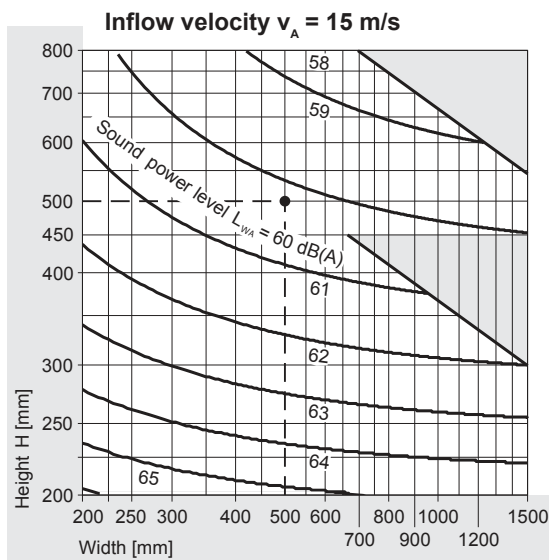
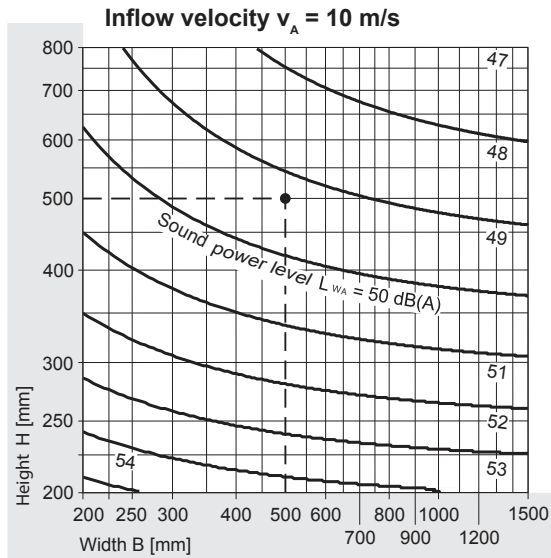
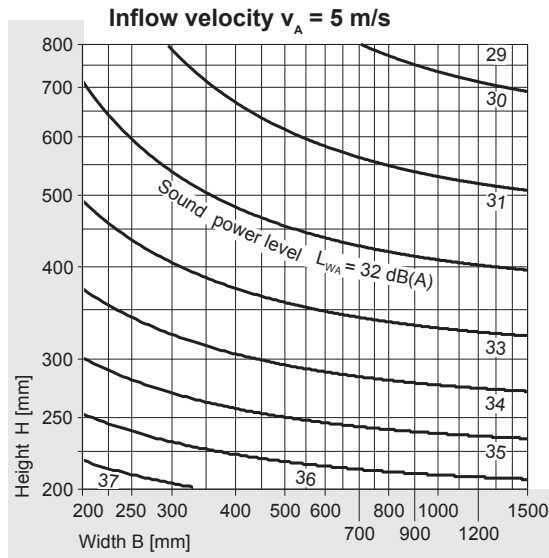


With inflow velocities $v_{A,Max} = 10$ to 20 m/s, depending on the width and height of the EK90 smoke control damper, the inflow velocity limits the opening of the smoke control damper. It may need to be reduced temporarily!

Example: The intersection point $B = 500$ mm with $H = 600$ mm lies in the field $v_{A,Max} = 20$ m/s. There is no restriction here! \Rightarrow see also table on page 7!

EK90 smoke control dampers

Sound power level L_{WA} / examples / inflow velocities v_A



Relative sound power level ΔL [dB]

f [Hz]	63	125	250	500	1000	2000	4000	8000
$v_A = 5$ m/s	16	8	2	-4	-8	-12	-15	-19
$v_A = 10$ m/s	10	4	1	-4	-6	-9	-12	-16
$v_A = 15$ m/s	5	2	0	-4	-6	-7	-11	-15
$v_A = 20$ m/s	2	-1	-2	-5	-6	-7	-11	-14

Examples

	1	2	3
Width B x height H	= 500 mm x 500 mm		
Inflow velocity v_A	= 10	15	20 m/s
Volume flow V	= 9000	13500	18000 m³/h
Pressure drop Δp_s	= 14	31	56 Pa
Sound power level L_{WA}	= 49	60	68 dB(A)
Sound power level L_{W-Oct}	=	$L_{WA} + \Delta L =$	

Example	63	125	250	500	1000	2000	4000	8000 Hz
1	59	53	50	45	43	40	37	33 [dB]
2	65	62	60	56	54	53	49	45 [dB]
3	70	67	66	63	62	61	57	54 [dB]

Nomenclature → see page 5

EK90 smoke control dampers can be used, opened and closed with inflow velocities of $v_A \leq 20$ m/s.

The inflow velocities for opening are limited to the values given in the table and in the diagrams:

H \ B	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1400	1500	
250																			19	19	18	
275																			18	18	17	16
300																			18	16	15	15
325																			16	15	14	14
350																			15	14	13	13
375																			15	14	13	12
400																			14	14	12	11
450	19	18	19	19	18	17	16	16	15	15	14	14	14	13	13	13	13	12	12	11	10	10
500																			19	19	18	18
550																			18	18	17	16
600																			17	17	16	15
650																			16	16	15	14
700																			15	15	14	14
750																			15	14	13	13
800																			14	14	13	12

In these ranges surrounded by the red border, opening is possible at an inflow velocity of v_A up to 20 m/s with a specially designed electrical connection! → see page 34

EK90 smoke control dampers

Volume flow, pressure drop, sound power level at 5 m/s inflow velocity (1)

H	B =	200	225	250	275	300	325	350	375	400	450	500	550	600	650	700
200	m ³ /h	720	810	900	990	1080	1170	1260	1350	1440	1620	1800	1980	2160	2340	2520
	Pa	17	16	16	15	15	15	14	14	14	14	13	13	13	13	13
	dB(A)	38	37	37	37	37	37	37	37	37	37	37	37	37	37	36
225	m ³ /h	810	911	1013	1114	1215	1316	1418	1519	1620	1823	2025	2228	2430	2633	2835
	Pa	14	13	13	12	12	12	11	11	11	11	11	11	10	10	10
	dB(A)	37	37	36	36	36	36	36	36	36	36	36	36	36	36	36
250	m ³ /h	900	1013	1125	1238	1350	1463	1575	1688	1800	2025	2250	2475	2700	2925	3150
	Pa	12	11	11	10	10	10	10	9	9	9	9	9	9	9	8
	dB(A)	36	36	36	36	35	35	35	35	35	35	35	35	35	35	35
275	m ³ /h	990	1114	1238	1361	1485	1609	1733	1856	1980	2228	2475	2723	2970	3218	3465
	Pa	10	10	9	9	9	8	8	8	8	8	8	7	7	7	7
	dB(A)	35	35	35	35	35	35	35	35	35	34	34	34	34	34	34
300	m ³ /h	1080	1215	1350	1485	1620	1755	1890	2025	2160	2430	2700	2970	3240	3510	3780
	Pa	9	8	8	8	8	7	7	7	7	7	7	7	6	6	6
	dB(A)	35	35	35	34	34	34	34	34	34	34	34	34	34	34	34
325	m ³ /h	1170	1316	1463	1609	1755	1901	2048	2194	2340	2633	2925	3218	3510	3803	4095
	Pa	8	8	7	7	7	7	7	6	6	6	6	6	6	6	6
	dB(A)	35	34	34	34	34	34	34	34	34	34	33	33	33	33	33
350	m ³ /h	1260	1418	1575	1733	1890	2048	2205	2363	2520	2835	3150	3465	3780	4095	4410
	Pa	7	7	7	6	6	6	6	6	6	6	5	5	5	5	5
	dB(A)	34	34	34	34	34	34	33	33	33	33	33	33	33	33	33
375	m ³ /h	1350	1519	1688	1856	2025	2194	2363	2531	2700	3038	3375	3713	4050	4388	4725
	Pa	7	6	6	6	6	6	5	5	5	5	5	5	5	5	5
	dB(A)	34	34	34	33	33	33	33	33	33	33	33	33	33	33	33
400	m ³ /h	1440	1620	1800	1980	2160	2340	2520	2700	2880	3240	3600	3960	4320	4680	5040
	Pa	6	6	6	5	5	5	5	5	5	5	5	4	4	4	4
	dB(A)	34	33	33	33	33	33	33	33	33	33	32	32	32	32	32
450	m ³ /h	1620	1823	2025	2228	2430	2633	2835	3038	3240	3645	4050	4455	4860	5265	5670
	Pa	6	5	5	5	5	5	4	4	4	4	4	4	4	4	4
	dB(A)	33	33	33	33	33	32	32	32	32	32	32	32	32	32	32
500	m ³ /h	1800	2025	2250	2475	2700	2925	3150	3375	3600	4050	4500	4950	5400	5850	6300
	Pa	5	5	5	4	4	4	4	4	4	4	3	3	3	3	3
	dB(A)	33	33	33	32	32	32	32	32	32	32	32	32	31	31	31
550	m ³ /h	1980	2228	2475	2723	2970	3218	3465	3713	3960	4455	4950	5445	5940	6435	6930
	Pa	5	4	4	4	4	4	4	3	3	3	3	3	3	3	3
	dB(A)	33	32	32	32	32	32	32	32	32	31	31	31	31	31	31
600	m ³ /h	2160	2430	2700	2970	3240	3510	3780	4050	4320	4860	5400	5940	6480	7020	7560
	Pa	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3
	dB(A)	32	32	32	32	32	32	31	31	31	31	31	31	31	31	31
650	m ³ /h	2340	2633	2925	3218	3510	3803	4095	4388	4680	5265	5850	6435	7020	7605	8190
	Pa	4	4	4	3	3	3	3	3	3	3	3	3	3	2	2
	dB(A)	32	32	32	32	31	31	31	31	31	31	31	31	31	31	31
700	m ³ /h	2520	2835	3150	3465	3780	4095	4410	4725	5040	5670	6300	6930	7560	8190	8820
	Pa	4	4	3	3	3	3	3	3	3	3	2	2	2	2	2
	dB(A)	32	32	32	31	31	31	31	31	31	31	31	31	30	30	30
750	m ³ /h	2700	3038	3375	3713	4050	4388	4725	5063	5400	6075	6750	7425	8100	8775	9450
	Pa	4	3	3	3	3	3	3	3	3	2	2	2	2	2	2
	dB(A)	32	32	31	31	31	31	31	31	31	31	30	30	30	30	30
800	m ³ /h	2880	3240	3600	3960	4320	4680	5040	5400	5760	6480	7200	7920	8640	9360	10080
	Pa	4	3	3	3	3	3	3	2	2	2	2	2	2	2	2
	dB(A)	32	31	31	31	31	31	31	31	31	30	30	30	30	30	30

EK90 smoke control dampers

Volume flow, pressure drop, sound power level at 5 m/s inflow velocity (2)

H	B =	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1400	1500
200	m ³ /h	2700	2880	3060	3240	3420	3600	3780	3960	4140	4320	4500	4680	5040	5400
	Pa	13	13	13	12	12	12	12	12	12	12	12	12	12	12
	dB(A)	36	36	36	36	36	36	36	36	36	36	36	36	36	36
225	m ³ /h	3038	3240	3443	3645	3848	4050	4253	4455	4658	4860	5063	5265	5670	6075
	Pa	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	dB(A)	35	35	35	35	35	35	35	35	35	35	35	35	35	35
250	m ³ /h	3375	3600	3825	4050	4275	4500	4725	4950	5175	5400	5625	5850	6300	6750
	Pa	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	dB(A)	35	35	35	35	35	35	35	35	35	35	35	35	35	34
275	m ³ /h	3713	3960	4208	4455	4703	4950	5198	5445	5693	5940	6188	6435	6930	7425
	Pa	7	7	7	7	7	7	7	7	7	7	7	7	7	7
	dB(A)	34	34	34	34	34	34	34	34	34	34	34	34	34	34
300	m ³ /h	4050	4320	4590	4860	5130	5400	5670	5940	6210	6480	6750	7020	7560	8100
	Pa	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	dB(A)	34	34	34	34	34	33	33	33	33	33	33	33	33	33
325	m ³ /h	4388	4680	4973	5265	5558	5850	6143	6435	6728	7020	7313	7605	8190	8775
	Pa	6	5	5	5	5	5	5	5	5	5	5	5	5	5
	dB(A)	33	33	33	33	33	33	33	33	33	33	33	33	33	33
350	m ³ /h	4725	5040	5355	5670	5985	6300	6615	6930	7245	7560	7875	8190	8820	9450
	Pa	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	dB(A)	33	33	33	33	33	33	33	33	33	33	33	33	33	33
375	m ³ /h	5063	5400	5738	6075	6413	6750	7088	7425	7763	8100	8438	8775	9450	10125
	Pa	5	4	4	4	4	4	4	4	4	4	4	4	4	4
	dB(A)	33	32	32	32	32	32	32	32	32	32	32	32	32	32
400	m ³ /h	5400	5760	6120	6480	6840	7200	7560	7920	8280	8640	9000	9360	10080	10800
	Pa	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	dB(A)	32	32	32	32	32	32	32	32	32	32	32	32	32	32
450	m ³ /h	6075	6480	6885	7290	7695	8100	8505	8910	9315	9720	10125	10530	11340	12150
	Pa	4	4	4	3	3	3	3	3	3	3	3	3	3	3
	dB(A)	32	32	32	32	32	32	32	32	32	32	32	31	31	31
500	m ³ /h	6750	7200	7650	8100	8550	9000	9450	9900	10350	10800	11250	11700	12600	13500
	Pa	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	dB(A)	31	31	31	31	31	31	31	31	31	31	31	31	31	31
550	m ³ /h	7425	7920	8415	8910	9405	9900	10395	10890	11385	11880	12375	12870	13860	14850
	Pa	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	dB(A)	31	31	31	31	31	31	31	31	31	31	31	31	31	31
600	m ³ /h	8100	8640	9180	9720	10260	10800	11340	11880	12420	12960	13500	14040	15120	16200
	Pa	3	3	3	2	2	2	2	2	2	2	2	2	2	2
	dB(A)	31	31	31	31	31	31	31	31	31	31	30	30	30	30
650	m ³ /h	8775	9360	9945	10530	11115	11700	12285	12870	13455	14040	14625	15210	16380	17550
	Pa	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	dB(A)	31	30	30	30	30	30	30	30	30	30	30	30	30	30
700	m ³ /h	9450	10080	10710	11340	11970	12600	13230	13860	14490	15120	15750	16380	17640	18900
	Pa	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	dB(A)	30	30	30	30	30	30	30	30	30	30	30	30	30	30
750	m ³ /h	10125	10800	11475	12150	12825	13500	14175	14850	15525	16200	16875	17550	18900	20250
	Pa	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	dB(A)	30	30	30	30	30	30	30	30	30	30	30	30	30	30
800	m ³ /h	10800	11520	12240	12960	13680	14400	15120	15840	16560	17280	18000	18720	20160	21600
	Pa	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	dB(A)	30	30	30	30	30	30	30	30	30	30	30	30	30	30

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Volume flow, pressure drop, sound power level at 10 m/s inflow velocity (1)

H	B =	200	225	250	275	300	325	350	375	400	450	500	550	600	650	700
200	m³/h	1440	1620	1800	1980	2160	2340	2520	2700	2880	3240	3600	3960	4320	4680	5040
	Pa	67	64	62	61	59	58	57	56	56	54	53	53	52	52	51
	dB(A)	55	55	55	55	55	55	55	55	55	55	54	54	54	54	54
225	m³/h	1620	1823	2025	2228	2430	2633	2835	3038	3240	3645	4050	4455	4860	5265	5670
	Pa	55	52	50	49	48	47	46	45	44	43	43	42	41	41	41
	dB(A)	54	54	54	54	54	54	54	54	54	54	53	53	53	53	53
250	m³/h	1800	2025	2250	2475	2700	2925	3150	3375	3600	4050	4500	4950	5400	5850	6300
	Pa	46	44	42	41	40	39	38	38	37	36	36	35	34	34	34
	dB(A)	54	54	53	53	53	53	53	53	53	53	53	53	53	53	52
275	m³/h	1980	2228	2475	2723	2970	3218	3465	3713	3960	4455	4950	5445	5940	6435	6930
	Pa	40	38	37	36	35	34	33	32	32	31	30	30	30	29	29
	dB(A)	53	53	53	53	53	52	52	52	52	52	52	52	52	52	52
300	m³/h	2160	2430	2700	2970	3240	3510	3780	4050	4320	4860	5400	5940	6480	7020	7560
	Pa	36	34	33	31	30	30	29	29	28	27	27	26	26	25	25
	dB(A)	53	53	52	52	52	52	52	52	52	52	52	52	51	51	51
325	m³/h	2340	2633	2925	3218	3510	3803	4095	4388	4680	5265	5850	6435	7020	7605	8190
	Pa	32	31	29	28	27	27	26	26	25	24	24	23	23	23	22
	dB(A)	52	52	52	52	52	52	51	51	51	51	51	51	51	51	51
350	m³/h	2520	2835	3150	3465	3780	4095	4410	4725	5040	5670	6300	6930	7560	8190	8820
	Pa	30	28	27	26	25	24	24	23	23	22	21	21	21	20	20
	dB(A)	52	52	52	51	51	51	51	51	51	51	51	51	51	51	51
375	m³/h	2700	3038	3375	3713	4050	4388	4725	5063	5400	6075	6750	7425	8100	8775	9450
	Pa	27	26	25	24	23	22	22	21	21	20	20	19	19	19	18
	dB(A)	52	51	51	51	51	51	51	51	51	51	50	50	50	50	50
400	m³/h	2880	3240	3600	3960	4320	4680	5040	5400	5760	6480	7200	7920	8640	9360	10080
	Pa	26	24	23	22	21	21	20	20	19	19	18	18	17	17	17
	dB(A)	51	51	51	51	51	51	51	50	50	50	50	50	50	50	50
450	m³/h	3240	3645	4050	4455	4860	5265	5670	6075	6480	7290	8100	8910	9720	10530	11340
	Pa	23	21	20	19	19	18	18	17	17	16	16	15	15	15	15
	dB(A)	51	51	51	50	50	50	50	50	50	50	50	50	50	49	49
500	m³/h	3600	4050	4500	4950	5400	5850	6300	6750	7200	8100	9000	9900	10800	11700	12600
	Pa	21	19	18	17	17	16	16	15	15	14	14	14	13	13	13
	dB(A)	51	50	50	50	50	50	50	50	50	49	49	49	49	49	49
550	m³/h	3960	4455	4950	5445	5940	6435	6930	7425	7920	8910	9900	10890	11880	12870	13860
	Pa	19	18	17	16	15	15	14	14	14	13	13	12	12	12	12
	dB(A)	50	50	50	50	50	49	49	49	49	49	49	49	49	49	49
600	m³/h	4320	4860	5400	5940	6480	7020	7560	8100	8640	9720	10800	11880	12960	14040	15120
	Pa	18	16	15	15	14	14	13	13	12	12	12	11	11	11	10
	dB(A)	50	50	50	49	49	49	49	49	49	49	49	49	48	48	48
650	m³/h	4680	5265	5850	6435	7020	7605	8190	8775	9360	10530	11700	12870	14040	15210	16380
	Pa	17	15	14	14	13	13	12	12	12	11	11	10	10	10	10
	dB(A)	50	50	49	49	49	49	49	49	49	49	48	48	48	48	48
700	m³/h	5040	5670	6300	6930	7560	8190	8820	9450	10080	11340	12600	13860	15120	16380	17640
	Pa	16	15	14	13	12	12	11	11	11	10	10	10	9	9	9
	dB(A)	50	49	49	49	49	49	49	49	48	48	48	48	48	48	48
750	m³/h	5400	6075	6750	7425	8100	8775	9450	10125	10800	12150	13500	14850	16200	17550	18900
	Pa	15	14	13	12	12	11	11	10	10	10	9	9	9	9	8
	dB(A)	50	49	49	49	49	49	48	48	48	48	48	48	48	48	48
800	m³/h	5760	6480	7200	7920	8640	9360	10080	10800	11520	12960	14400	15840	17280	18720	20160
	Pa	14	13	12	12	11	11	10	10	10	9	9	8	8	8	8
	dB(A)	49	49	49	49	49	48	48	48	48	48	48	48	48	48	48

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Volume flow, pressure drop, sound power level at 10 m/s inflow velocity (2)

H	B =	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1400	1500
200	m ³ /h	5400	5760	6120	6480	6840	7200	7560	7920	8280	8640	9000	9360	10080	10800
	Pa	51	50	50	50	50	49	49	49	49	49	49	49	48	48
	dB(A)	54	54	54	54	54	54	54	54	54	54	54	54	54	54
225	m ³ /h	6075	6480	6885	7290	7695	8100	8505	8910	9315	9720	10125	10530	11340	12150
	Pa	40	40	40	40	39	39	39	39	39	39	39	39	38	38
	dB(A)	53	53	53	53	53	53	53	53	53	53	53	53	53	53
250	m ³ /h	6750	7200	7650	8100	8550	9000	9450	9900	10350	10800	11250	11700	12600	13500
	Pa	33	33	33	33	33	32	32	32	32	32	32	32	32	31
	dB(A)	52	52	52	52	52	52	52	52	52	52	52	52	52	52
275	m ³ /h	7425	7920	8415	8910	9405	9900	10395	10890	11385	11880	12375	12870	13860	14850
	Pa	29	28	28	28	28	28	28	27	27	27	27	27	27	27
	dB(A)	52	52	52	52	52	52	52	52	52	52	52	52	52	52
300	m ³ /h	8100	8640	9180	9720	10260	10800	11340	11880	12420	12960	13500	14040	15120	16200
	Pa	25	25	25	24	24	24	24	24	24	24	24	24	23	23
	dB(A)	51	51	51	51	51	51	51	51	51	51	51	51	51	51
325	m ³ /h	8775	9360	9945	10530	11115	11700	12285	12870	13455	14040	14625	15210	16380	17550
	Pa	22	22	22	22	21	21	21	21	21	21	21	21	21	21
	dB(A)	51	51	51	51	51	51	51	51	51	51	51	51	51	51
350	m ³ /h	9450	10080	10710	11340	11970	12600	13230	13860	14490	15120	15750	16380	17640	18900
	Pa	20	20	20	19	19	19	19	19	19	19	19	19	19	18
	dB(A)	51	50	50	50	50	50	50	50	50	50	50	50	50	50
375	m ³ /h	10125	10800	11475	12150	12825	13500	14175	14850	15525	16200	16875	17550	18900	20250
	Pa	18	18	18	18	18	17	17	17	17	17	17	17	17	17
	dB(A)	50	50	50	50	50	50	50	50	50	50	50	50	50	50
400	m ³ /h	10800	11520	12240	12960	13680	14400	15120	15840	16560	17280	18000	18720	20160	21600
	Pa	17	16	16	16	16	16	16	16	16	16	16	16	15	15
	dB(A)	50	50	50	50	50	50	50	50	50	50	50	50	50	50
450	m ³ /h	12150	12960	13770	14580	15390	16200	17010	17820	18630	19440	20250	21060	22680	24300
	Pa	14	14	14	14	14	14	14	14	13	13	13	13	13	13
	dB(A)	49	49	49	49	49	49	49	49	49	49	49	49	49	49
500	m ³ /h	13500	14400	15300	16200	17100	18000	18900	19800	20700	21600	22500	23400	25200	27000
	Pa	13	13	12	12	12	12	12	12	12	12	12	12	12	11
	dB(A)	49	49	49	49	49	49	49	49	49	49	49	49	49	49
550	m ³ /h	14850	15840	16830	17820	18810	19800	20790	21780	22770	23760	24750	25740	27720	29700
	Pa	11	11	11	11	11	11	11	11	11	10	10	10	10	10
	dB(A)	49	49	49	49	48	48	48	48	48	48	48	48	48	48
600	m ³ /h	16200	17280	18360	19440	20520	21600	22680	23760	24840	25920	27000	28080	30240	32400
	Pa	10	10	10	10	10	10	10	10	10	9	9	9	9	9
	dB(A)	48	48	48	48	48	48	48	48	48	48	48	48	48	48
650	m ³ /h	17550	18720	19890	21060	22230	23400	24570	25740	26910	28080	29250	30420	32760	35100
	Pa	9	9	9	9	9	9	9	9	9	9	9	9	8	8
	dB(A)	48	48	48	48	48	48	48	48	48	48	48	48	48	48
700	m ³ /h	18900	20160	21420	22680	23940	25200	26460	27720	28980	30240	31500	32760	35280	37800
	Pa	9	9	9	8	8	8	8	8	8	8	8	8	8	8
	dB(A)	48	48	48	48	48	48	48	48	48	48	48	48	47	47
750	m ³ /h	20250	21600	22950	24300	25650	27000	28350	29700	31050	32400	33750	35100	37800	40500
	Pa	8	8	8	8	8	8	8	8	7	7	7	7	7	7
	dB(A)	48	48	48	47	47	47	47	47	47	47	47	47	47	47
800	m ³ /h	21600	23040	24480	25920	27360	28800	30240	31680	33120	34560	36000	37440	40320	43200
	Pa	8	8	7	7	7	7	7	7	7	7	7	7	7	7
	dB(A)	47	47	47	47	47	47	47	47	47	47	47	47	47	47

EK90 smoke control dampers

Volume flow, pressure drop, sound power level at 15 m/s inflow velocity (1)

H	B =	200	225	250	275	300	325	350	375	400	450	500	550	600	650	700
200	m³/h	2160	2430	2700	2970	3240	3510	3780	4050	4320	4860	5400	5940	6480	7020	7560
	Pa	151	145	140	136	133	131	128	127	125	122	120	118	117	116	115
	dB(A)	66	66	66	66	66	65	65	65	65	65	65	65	65	65	65
225	m³/h	2430	2734	3038	3341	3645	3949	4253	4556	4860	5468	6075	6683	7290	7898	8505
	Pa	123	118	113	110	107	105	103	101	100	98	96	95	93	92	92
	dB(A)	65	65	65	65	65	65	65	64	64	64	64	64	64	64	64
250	m³/h	2700	3038	3375	3713	4050	4388	4725	5063	5400	6075	6750	7425	8100	8775	9450
	Pa	104	99	95	92	90	88	86	85	84	82	80	79	78	77	76
	dB(A)	65	64	64	64	64	64	64	64	64	64	64	63	63	63	63
275	m³/h	2970	3341	3713	4084	4455	4826	5198	5569	5940	6683	7425	8168	8910	9653	10395
	Pa	91	86	83	80	78	76	74	73	72	70	69	67	66	66	65
	dB(A)	64	64	64	64	63	63	63	63	63	63	63	63	63	63	63
300	m³/h	3240	3645	4050	4455	4860	5265	5670	6075	6480	7290	8100	8910	9720	10530	11340
	Pa	81	76	73	71	69	67	65	64	63	61	60	59	58	57	57
	dB(A)	64	63	63	63	63	63	63	63	63	63	62	62	62	62	62
325	m³/h	3510	3949	4388	4826	5265	5704	6143	6581	7020	7898	8775	9653	10530	11408	12285
	Pa	73	69	66	63	62	60	59	57	56	55	54	52	52	51	50
	dB(A)	63	63	63	63	63	62	62	62	62	62	62	62	62	62	62
350	m³/h	3780	4253	4725	5198	5670	6143	6615	7088	7560	8505	9450	10395	11340	12285	13230
	Pa	67	63	60	58	56	54	53	52	51	50	48	47	47	46	45
	dB(A)	63	63	62	62	62	62	62	62	62	62	62	62	62	62	61
375	m³/h	4050	4556	5063	5569	6075	6581	7088	7594	8100	9113	10125	11138	12150	13163	14175
	Pa	62	58	55	53	51	50	49	48	47	45	44	43	42	42	41
	dB(A)	63	62	62	62	62	62	62	62	62	61	61	61	61	61	61
400	m³/h	4320	4860	5400	5940	6480	7020	7560	8100	8640	9720	10800	11880	12960	14040	15120
	Pa	58	54	51	49	48	46	45	44	43	42	41	40	39	38	38
	dB(A)	62	62	62	62	62	62	61	61	61	61	61	61	61	61	61
450	m³/h	4860	5468	6075	6683	7290	7898	8505	9113	9720	10935	12150	13365	14580	15795	17010
	Pa	51	48	45	43	42	41	39	39	38	36	35	34	34	33	33
	dB(A)	62	62	61	61	61	61	61	61	61	61	61	61	60	60	60
500	m³/h	5400	6075	6750	7425	8100	8775	9450	10125	10800	12150	13500	14850	16200	17550	18900
	Pa	46	43	41	39	38	36	35	34	34	32	31	31	30	29	29
	dB(A)	62	61	61	61	61	61	61	61	60	60	60	60	60	60	60
550	m³/h	5940	6683	7425	8168	8910	9653	10395	11138	11880	13365	14850	16335	17820	19305	20790
	Pa	43	40	38	36	34	33	32	31	30	29	28	28	27	26	26
	dB(A)	61	61	61	61	61	60	60	60	60	60	60	60	60	60	60
600	m³/h	6480	7290	8100	8910	9720	10530	11340	12150	12960	14580	16200	17820	19440	21060	22680
	Pa	40	37	35	33	32	30	30	29	28	27	26	25	25	24	24
	dB(A)	61	61	61	60	60	60	60	60	60	60	60	60	59	59	59
650	m³/h	7020	7898	8775	9653	10530	11408	12285	13163	14040	15795	17550	19305	21060	22815	24570
	Pa	37	35	33	31	30	28	27	27	26	25	24	23	23	22	22
	dB(A)	61	61	60	60	60	60	60	60	60	59	59	59	59	59	59
700	m³/h	7560	8505	9450	10395	11340	12285	13230	14175	15120	17010	18900	20790	22680	24570	26460
	Pa	36	33	31	29	28	27	26	25	24	23	22	22	21	21	20
	dB(A)	61	60	60	60	60	60	60	59	59	59	59	59	59	59	59
750	m³/h	8100	9113	10125	11138	12150	13163	14175	15188	16200	18225	20250	22275	24300	26325	28350
	Pa	34	31	29	28	26	25	24	24	23	22	21	20	20	19	19
	dB(A)	60	60	60	60	60	60	59	59	59	59	59	59	59	59	59
800	m³/h	8640	9720	10800	11880	12960	14040	15120	16200	17280	19440	21600	23760	25920	28080	
	Pa	32	30	28	26	25	24	23	22	22	21	20	19	19	18	
	dB(A)	60	60	60	60	59	59	59	59	59	59	59	59	59	59	

This volume flow requires a special electrical connection design! → page 34

EK90 smoke control dampers

Volume flow, pressure drop, sound power level at 15 m/s inflow velocity (2)

H	B =	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1400	1500
200	m³/h	8100	8640	9180	9720	10260	10800	11340	11880	12420	12960	13500	14040	15120	16200
	Pa	114	113	113	112	112	111	111	110	110	110	109	109	109	108
	dB(A)	65	65	65	65	65	65	65	65	65	65	65	65	65	65
225	m³/h	9113	9720	10328	10935	11543	12150	12758	13365	13973	14580	15188	15795	17010	18225
	Pa	91	90	90	89	89	88	88	88	87	87	87	87	86	86
	dB(A)	64	64	64	64	64	64	64	64	64	64	64	64	64	64
250	m³/h	10125	10800	11475	12150	12825	13500	14175	14850	15525	16200	16875	17550	18900	20250
	Pa	75	75	74	74	73	73	73	72	72	72	72	72	71	71
	dB(A)	63	63	63	63	63	63	63	63	63	63	63	63	63	63
275	m³/h	11138	11880	12623	13365	14108	14850	15593	16335	17078	17820	18563	19305	20790	22275
	Pa	64	64	63	63	63	62	62	62	61	61	61	61	61	60
	dB(A)	63	63	63	63	63	63	63	63	63	63	63	63	63	62
300	m³/h	12150	12960	13770	14580	15390	16200	17010	17820	18630	19440	20250	21060	22680	24300
	Pa	56	56	55	55	55	54	54	54	53	53	53	53	53	52
	dB(A)	62	62	62	62	62	62	62	62	62	62	62	62	62	62
325	m³/h	13163	14040	14918	15795	16673	17550	18428	19305	20183	21060	21938	22815	24570	26325
	Pa	50	49	49	49	48	48	48	48	47	47	47	47	47	46
	dB(A)	62	62	62	62	62	62	62	62	62	62	62	62	62	62
350	m³/h	14175	15120	16065	17010	17955	18900	19845	20790	21735	22680	23625	24570	26460	28350
	Pa	45	44	44	44	43	43	43	43	43	42	42	42	42	42
	dB(A)	61	61	61	61	61	61	61	61	61	61	61	61	61	61
375	m³/h	15188	16200	17213	18225	19238	20250	21263	22275	23288	24300	25313	26325	28350	30375
	Pa	41	40	40	40	39	39	39	39	39	38	38	38	38	38
	dB(A)	61	61	61	61	61	61	61	61	61	61	61	61	61	61
400	m³/h	16200	17280	18360	19440	20520	21600	22680	23760	24840	25920	27000	28080	30240	32400
	Pa	37	37	37	36	36	36	36	36	35	35	35	35	35	34
	dB(A)	61	61	61	61	61	61	61	61	61	61	61	61	61	61
450	m³/h	18225	19440	20655	21870	23085	24300	25515	26730	27945	29160	30375	31590	34020	36450
	Pa	32	32	32	31	31	31	31	30	30	30	30	30	30	29
	dB(A)	60	60	60	60	60	60	60	60	60	60	60	60	60	60
500	m³/h	20250	21600	22950	24300	25650	27000	28350	29700	31050	32400	33750	35100	37800	40500
	Pa	28	28	28	28	27	27	27	27	27	26	26	26	26	26
	dB(A)	60	60	60	60	60	60	60	60	60	60	60	60	60	60
550	m³/h	22275	23760	25245	26730	28215	29700	31185	32670	34155	35640	37125	38610	41580	
	Pa	26	25	25	25	24	24	24	24	24	24	23	23	23	
	dB(A)	60	60	59	59	59	59	59	59	59	59	59	59	59	
600	m³/h	24300	25920	27540	29160	30780	32400	34020	35640	37260	38880				
	Pa	23	23	23	22	22	22	22	22	21	21				
	dB(A)	59	59	59	59	59	59	59	59	59	59				
650	m³/h	26325	28080	29835	31590	33345	35100	36855							
	Pa	21	21	21	21	20	20	20							
	dB(A)	59	59	59	59	59	59	59							
700	m³/h	28350	30240	32130	34020										
	Pa	20	19	19	19										
	dB(A)	59	59	59	59										
750	m³/h	30375													
	Pa	18													
	dB(A)	59													

The volume flows in the areas marked require a special electrical connection design!
 => see page 34

EK90 smoke control dampers

Volume flow, pressure drop, sound power level at 20 m/s inflow velocity (1)

H	B =	200	225	250	275	300	325	350	375	400	450	500	550	600	650	700
200	m³/h	2880	3240	3600	3960	4320	4680	5040	5400	5760	6480	7200	7920	8640	9360	10080
	Pa	269	258	249	242	237	232	228	225	222	217	214	211	208	206	204
	dB(A)	74	74	74	73	73	73	73	73	73	73	73	73	73	73	73
225	m³/h	3240	3645	4050	4455	4860	5265	5670	6075	6480	7290	8100	8910	9720	10530	11340
	Pa	219	209	201	196	191	187	183	180	178	174	171	168	166	164	163
	dB(A)	73	73	73	73	73	72	72	72	72	72	72	72	72	72	72
250	m³/h	3600	4050	4500	4950	5400	5850	6300	6750	7200	8100	9000	9900	10800	11700	12600
	Pa	185	176	170	164	160	156	153	151	149	145	142	140	138	136	135
	dB(A)	72	72	72	72	72	72	72	72	72	71	71	71	71	71	71
275	m³/h	3960	4455	4950	5445	5940	6435	6930	7425	7920	8910	9900	10890	11880	12870	13860
	Pa	161	153	147	142	138	135	132	130	128	124	122	120	118	117	115
	dB(A)	72	72	72	71	71	71	71	71	71	71	71	71	71	71	71
300	m³/h	4320	4860	5400	5940	6480	7020	7560	8100	8640	9720	10800	11880	12960	14040	15120
	Pa	143	136	130	126	122	119	116	114	112	109	107	105	103	102	101
	dB(A)	71	71	71	71	71	71	71	71	71	70	70	70	70	70	70
325	m³/h	4680	5265	5850	6435	7020	7605	8190	8775	9360	10530	11700	12870	14040	15210	16380
	Pa	129	122	117	113	109	107	104	102	100	97	95	93	92	91	89
	dB(A)	71	71	71	71	70	70	70	70	70	70	70	70	70	70	70
350	m³/h	5040	5670	6300	6930	7560	8190	8820	9450	10080	11340	12600	13860	15120	16380	17640
	Pa	118	112	107	103	99	97	94	93	91	88	86	84	83	82	81
	dB(A)	71	71	70	70	70	70	70	70	70	70	70	70	69	69	69
375	m³/h	5400	6075	6750	7425	8100	8775	9450	10125	10800	12150	13500	14850	16200	17550	18900
	Pa	110	103	98	95	91	89	87	85	83	81	79	77	75	74	73
	dB(A)	70	70	70	70	70	70	70	70	69	69	69	69	69	69	69
400	m³/h	5760	6480	7200	7920	8640	9360	10080	10800	11520	12960	14400	15840	17280	18720	20160
	Pa	102	96	91	88	85	82	80	78	77	74	72	71	69	68	67
	dB(A)	70	70	70	70	70	69	69	69	69	69	69	69	69	69	69
450	m³/h	6480	7290	8100	8910	9720	10530	11340	12150	12960	14580	16200	17820	19440	21060	22680
	Pa	91	85	81	77	74	72	70	68	67	65	63	61	60	59	58
	dB(A)	70	70	69	69	69	69	69	69	69	69	69	69	68	68	68
500	m³/h	7200	8100	9000	9900	10800	11700	12600	13500	14400	16200	18000	19800	21600	23400	25200
	Pa	82	77	73	69	67	65	63	61	60	58	56	54	53	52	51
	dB(A)	69	69	69	69	69	69	69	68	68	68	68	68	68	68	68
550	m³/h	7920	8910	9900	10890	11880	12870	13860	14850	15840	17820	19800	21780	23760	25740	27720
	Pa	76	71	67	63	61	59	57	55	54	52	50	49	48	47	46
	dB(A)	69	69	69	69	68	68	68	68	68	68	68	68	68	68	68
600	m³/h	8640	9720	10800	11880	12960	14040	15120	16200	17280	19440	21600	23760	25920	28080	
	Pa	71	66	62	59	56	54	52	51	50	48	46	45	44	43	
	dB(A)	69	69	68	68	68	68	68	68	68	68	68	68	67	67	67
650	m³/h	9360	10530	11700	12870	14040	15210	16380	17550	18720	21060	23400	25740			
	Pa	67	62	58	55	52	50	49	47	46	44	43	41			
	dB(A)	69	68	68	68	68	68	68	68	68	67	67	67			
700	m³/h	10080	11340	12600	13860	15120	16380	17640	18900	20160	22680	25200				
	Pa	63	58	55	52	49	47	46	44	43	41	40				
	dB(A)	69	68	68	68	68	68	68	67	67	67	67				
750	m³/h	10800	12150	13500	14850	16200	17550	18900	20250	21600						
	Pa	60	56	52	49	47	45	43	42	41						
	dB(A)	68	68	68	68	68	67	67	67	67						
800	m³/h	11520	12960	14400	15840	17280	18720	20160	21600							
	Pa	58	53	50	47	45	43	41	40							
	dB(A)	68	68	68	68	67	67	67	67							

The volume flows in the areas marked require a special electrical connection design!
⇒ see page 34

EK90 smoke control dampers

Volume flow, pressure drop, sound power level at 20 m/s inflow velocity (2)

H	B =	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1400	1500
200	m³/h	10800	11520	12240	12960	13680	14400	15120	15840	16560	17280	18000	18720	20160	21600
	Pa	203	202	200	199	198	198	197	196	196	195	195	194	193	193
	dB(A)	73	73	73	73	73	73	73	73	73	73	73	73	73	73
225	m³/h	12150	12960	13770	14580	15390	16200	17010	17820	18630	19440	20250	21060	22680	24300
	Pa	161	160	159	158	158	157	156	156	155	155	154	154	153	153
	dB(A)	72	72	72	72	72	72	72	72	72	72	72	72	72	72
250	m³/h	13500	14400	15300	16200	17100	18000	18900	19800	20700	21600	22500	23400	25200	27000
	Pa	134	133	132	131	130	130	129	129	128	128	128	127	127	126
	dB(A)	71	71	71	71	71	71	71	71	71	71	71	71	71	71
275	m³/h	14850	15840	16830	17820	18810	19800	20790	21780	22770	23760	24750	25740	27720	29700
	Pa	114	113	113	112	111	111	110	110	109	109	109	108	108	107
	dB(A)	71	71	71	71	71	70	70	70	70	70	70	70	70	70
300	m³/h	16200	17280	18360	19440	20520	21600	22680	23760	24840	25920	27000	28080	30240	32400
	Pa	100	99	98	97	97	96	96	95	95	95	94	94	94	93
	dB(A)	70	70	70	70	70	70	70	70	70	70	70	70	70	70
325	m³/h	17550	18720	19890	21060	22230	23400	24570	25740	26910	28080	29250	30420	32760	35100
	Pa	89	88	87	86	86	85	85	85	84	84	84	83	83	82
	dB(A)	70	70	70	70	70	70	70	70	70	70	69	69	69	69
350	m³/h	18900	20160	21420	22680	23940	25200	26460	27720	28980	30240	31500	32760	35280	37800
	Pa	80	79	78	78	77	77	76	76	76	75	75	75	74	74
	dB(A)	69	69	69	69	69	69	69	69	69	69	69	69	69	69
375	m³/h	20250	21600	22950	24300	25650	27000	28350	29700	31050	32400	33750	35100	37800	40500
	Pa	73	72	71	71	70	70	69	69	69	68	68	68	67	67
	dB(A)	69	69	69	69	69	69	69	69	69	69	69	69	69	69
400	m³/h	21600	23040	24480	25920	27360	28800	30240	31680	33120	34560	36000	37440	40320	43200
	Pa	67	66	65	65	64	64	63	63	63	63	62	62	62	61
	dB(A)	69	69	69	69	69	69	69	69	69	69	69	68	68	68
450	m³/h	24300	25920	27540	29160	30780	32400	34020	35640	37260	38880				
	Pa	57	57	56	56	55	55	54	54	54	54				
	dB(A)	68	68	68	68	68	68	68	68	68	68				
500	m³/h	27000	28800	30600	32400	34200	36000								
	Pa	51	50	49	49	49	48								
	dB(A)	68	68	68	68	68	68								
550	m³/h	29700	31680												
	Pa	45	45												
	dB(A)	68	67												

The volume flows in the areas marked require a special electrical connection design!
 ⇒ see page 34

EK90 smoke control dampers

Free cross-sections

Free cross-sections A_{free} [m²]

H	B = 200	225	250	275	300	325	350	375	400	450	500	550	600	650	700
200	0.023	0.027	0.030	0.033	0.036	0.040	0.043	0.046	0.049	0.056	0.062	0.069	0.075	0.082	0.088
225	0.028	0.032	0.036	0.040	0.043	0.047	0.051	0.055	0.059	0.067	0.074	0.082	0.090	0.098	0.105
250	0.032	0.037	0.041	0.046	0.050	0.055	0.059	0.064	0.068	0.077	0.086	0.095	0.104	0.113	0.122
275	0.037	0.042	0.047	0.052	0.057	0.063	0.068	0.073	0.078	0.088	0.098	0.109	0.119	0.129	0.139
300	0.041	0.047	0.053	0.059	0.064	0.070	0.076	0.082	0.087	0.099	0.110	0.122	0.133	0.145	0.156
325	0.046	0.052	0.059	0.065	0.071	0.078	0.084	0.091	0.097	0.110	0.122	0.135	0.148	0.161	0.173
350	0.050	0.057	0.064	0.071	0.078	0.085	0.092	0.099	0.106	0.120	0.134	0.148	0.162	0.176	0.190
375	0.055	0.063	0.070	0.078	0.085	0.093	0.101	0.108	0.116	0.131	0.146	0.162	0.177	0.192	0.207
400	0.059	0.068	0.076	0.084	0.092	0.101	0.109	0.117	0.125	0.142	0.158	0.175	0.191	0.208	0.224
450	0.068	0.078	0.087	0.097	0.106	0.116	0.125	0.135	0.144	0.163	0.182	0.201	0.220	0.239	0.258
500	0.077	0.088	0.099	0.110	0.120	0.131	0.142	0.153	0.163	0.185	0.206	0.228	0.249	0.271	0.292
550	0.086	0.098	0.110	0.122	0.134	0.146	0.158	0.170	0.182	0.206	0.230	0.254	0.278	0.302	0.326
600	0.095	0.109	0.122	0.135	0.148	0.162	0.175	0.188	0.201	0.228	0.254	0.281	0.307	0.334	0.360
650	0.104	0.119	0.133	0.148	0.162	0.177	0.191	0.206	0.220	0.249	0.278	0.307	0.336	0.365	0.394
700	0.113	0.129	0.145	0.161	0.176	0.192	0.208	0.224	0.239	0.271	0.302	0.334	0.365	0.397	0.428
750	0.122	0.139	0.156	0.173	0.190	0.207	0.224	0.241	0.258	0.292	0.326	0.360	0.394	0.428	0.462
800	0.131	0.150	0.168	0.186	0.204	0.223	0.241	0.259	0.277	0.314	0.350	0.387	0.423	0.460	0.496

H	B = 750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1400	1500
200	0.095	0.101	0.108	0.114	0.121	0.127	0.134	0.140	0.147	0.153	0.160	0.166	0.179	0.192
225	0.113	0.121	0.129	0.136	0.144	0.152	0.160	0.167	0.175	0.183	0.191	0.198	0.214	0.229
250	0.131	0.140	0.149	0.158	0.167	0.176	0.185	0.194	0.203	0.212	0.221	0.230	0.248	0.266
275	0.150	0.160	0.170	0.180	0.191	0.201	0.211	0.221	0.232	0.242	0.252	0.262	0.283	0.303
300	0.168	0.179	0.191	0.202	0.214	0.225	0.237	0.248	0.260	0.271	0.283	0.294	0.317	0.340
325	0.186	0.199	0.212	0.224	0.237	0.250	0.263	0.275	0.288	0.301	0.314	0.326	0.352	0.377
350	0.204	0.218	0.232	0.246	0.260	0.274	0.288	0.302	0.316	0.330	0.344	0.358	0.386	0.414
375	0.223	0.238	0.253	0.268	0.284	0.299	0.314	0.329	0.345	0.360	0.375	0.390	0.421	0.451
400	0.241	0.257	0.274	0.290	0.307	0.323	0.340	0.356	0.373	0.389	0.406	0.422	0.455	0.488
450	0.277	0.296	0.315	0.334	0.353	0.372	0.391	0.410	0.429	0.448	0.467	0.486	0.524	0.562
500	0.314	0.335	0.357	0.378	0.400	0.421	0.443	0.464	0.486	0.507	0.529	0.550	0.593	0.636
550	0.350	0.374	0.398	0.422	0.446	0.470	0.494	0.518	0.542	0.566	0.590	0.614	0.662	0.710
600	0.387	0.413	0.440	0.466	0.493	0.519	0.546	0.572	0.599	0.625	0.652	0.678	0.731	0.784
650	0.423	0.452	0.481	0.510	0.539	0.568	0.597	0.626	0.655	0.684	0.713	0.742	0.800	0.858
700	0.460	0.491	0.523	0.554	0.586	0.617	0.649	0.680	0.712	0.743	0.775	0.806	0.869	0.932
750	0.496	0.530	0.564	0.598	0.632	0.666	0.700	0.734	0.768	0.802	0.836	0.870	0.938	1.006
800	0.533	0.569	0.606	0.642	0.679	0.715	0.752	0.788	0.825	0.861	0.898	0.934	1.007	1.080

EK90 smoke control dampers

Weights

Weights [kg] for the length L = 500 mm

H	B = 200	225	250	275	300	325	350	375	400	450	500	550	600	650	700
200	39	40	41	42	44	45	46	47	49	51	53	56	58	61	63
225	40	41	42	44	45	46	47	49	50	52	55	57	60	62	65
250	41	42	44	45	46	48	49	50	51	54	56	59	61	64	67
275	42	44	45	46	48	49	50	51	53	55	58	60	63	66	68
300	44	45	46	48	49	50	52	53	54	57	59	62	65	67	70
325	45	46	48	49	50	52	53	54	55	58	61	63	66	69	71
350	46	47	49	50	52	53	54	56	57	60	62	65	68	70	73
375	47	49	50	51	53	54	56	57	58	61	64	66	69	72	75
400	49	50	51	53	54	55	57	58	60	62	65	68	71	73	76
450	51	52	54	55	57	58	60	61	62	65	68	71	74	77	80
500	53	55	56	58	59	61	62	64	65	68	71	74	77	80	83
550	56	57	59	60	62	63	65	66	68	71	74	77	80	83	86
600	58	60	61	63	65	66	68	69	71	74	77	80	83	86	89
650	61	62	64	66	67	69	70	72	73	77	80	83	86	89	92
700	63	65	67	68	70	71	73	75	76	80	83	86	89	92	96
750	66	67	69	71	72	74	76	77	79	82	86	89	92	96	99
800	68	70	72	73	75	77	78	80	82	85	89	92	95	99	102

H	B = 750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1400	1500
200	66	68	71	73	76	78	80	83	85	88	90	93	98	102
225	67	70	72	75	77	80	82	85	87	90	92	95	100	105
250	69	72	74	77	79	82	84	87	89	92	94	97	102	107
275	71	73	76	78	81	84	86	89	91	94	96	99	104	109
300	72	75	78	80	83	85	88	91	93	96	98	101	106	111
325	74	77	79	82	85	87	90	93	95	98	101	103	108	114
350	76	78	81	84	86	89	92	95	97	100	103	105	111	116
375	77	80	83	86	88	91	94	96	99	102	105	107	113	118
400	79	82	85	87	90	93	96	98	101	104	107	109	115	121
450	82	85	88	91	94	97	99	102	105	108	111	114	119	125
500	86	89	92	94	97	100	103	106	109	112	115	118	124	130
550	89	92	95	98	101	104	107	110	113	116	119	122	128	134
600	92	95	99	102	105	108	111	114	117	120	123	126	132	139
650	96	99	102	105	108	112	115	118	121	124	127	131	137	143
700	99	102	105	109	112	115	118	122	125	128	131	135	141	148
750	102	106	109	112	116	119	122	126	129	132	136	139	146	152
800	106	109	112	116	119	123	126	130	133	136	140	143	150	157

The weights for other lengths L can be calculated with sufficient accuracy:

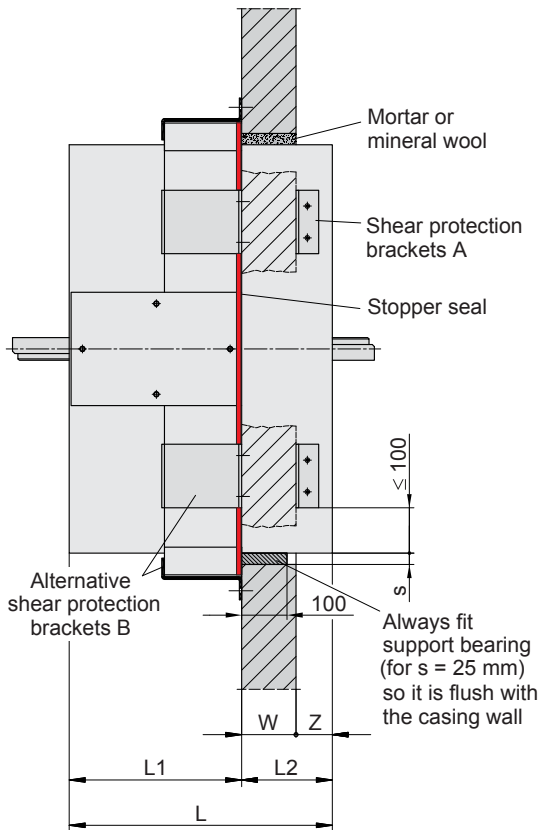
Length L:	350 mm:	Factor 0.85 or	-15%
	400 mm:	Factor 0.90 or	-10%
	450 mm:	Factor 0.95 or	-5%
	500 mm:	Factor 1.00 or	0%
	600 mm:	Factor 1.10 or	+10%
	700 mm:	Factor 1.20 or	+20%
	800 mm:	Factor 1.30 or	+30%
	850 mm:	Factor 1.35 or	+35%

EK90 smoke control dampers

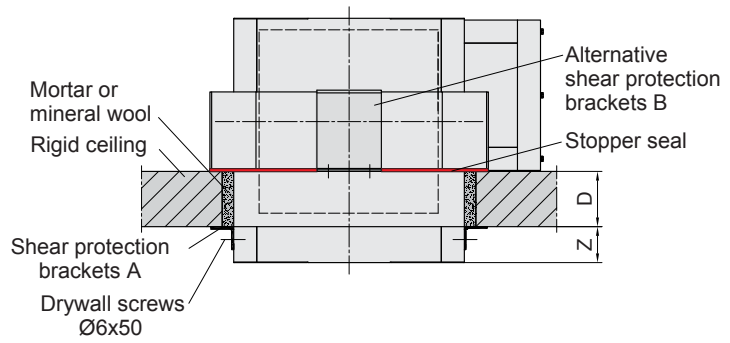
Installation in rigid walls and ceilings (1) General

The installation in rigid walls and ceilings from a thickness of 100 mm is performed as wet installation using mortar. Gaps of up to 25 mm in width can also be filled with mineral wool $\geq 100 \text{ kg/m}^3$ and $\geq 1000^\circ\text{C}$ melting point. **Shear protection brackets A** protect installation at the rear. Alternatively, **shear protection brackets B** can be used, especially if the installation openings are only accessible from the front, i.e. from the drive side, such as is the case with shaft walls.

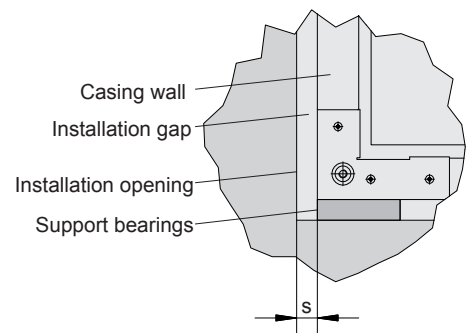
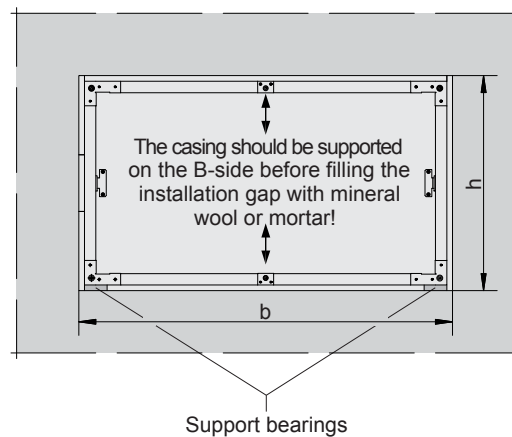
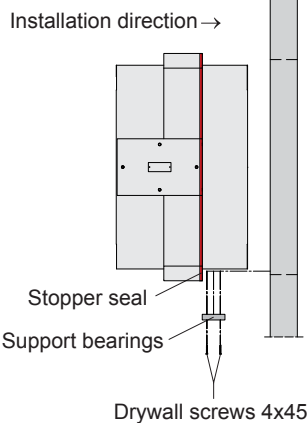
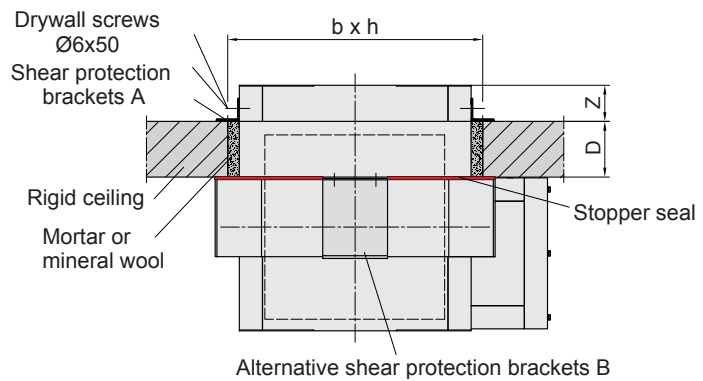
Installation in rigid walls



Vertical installation in ceilings (motor drive above ceiling)



Suspended installation in ceilings (motor drive underneath the ceiling)



All dimensions in mm

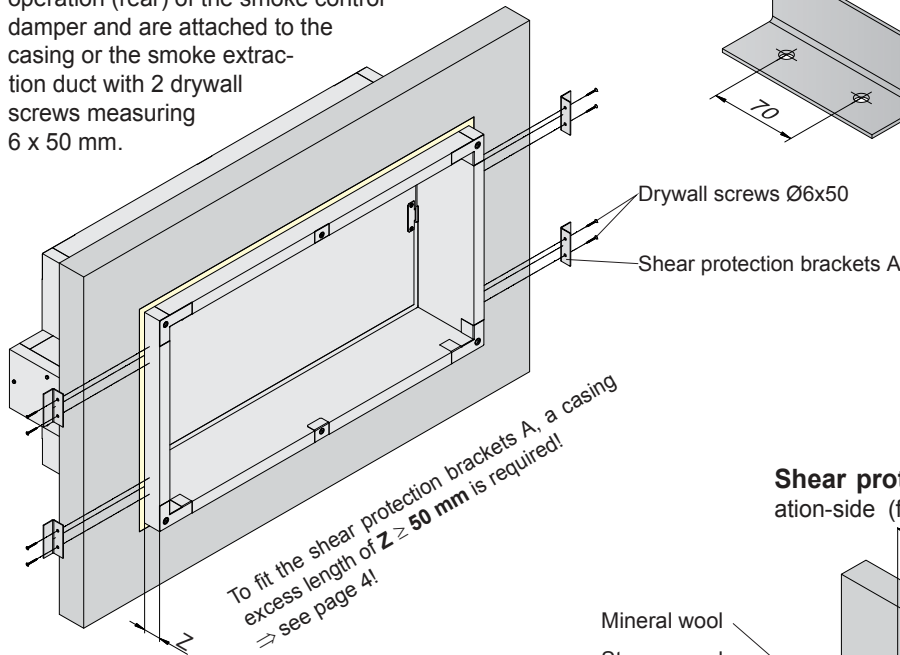
Installation in rigid walls and ceilings

- Outer dimensions of the smoke control dampers in the installation area of the wall or ceiling: $(B + 100 \text{ mm}) \times (H + 100 \text{ mm})$.
- Installation opening in rigid walls and ceilings $b \times h = (B + 100 \text{ mm} + 2 \cdot s \text{ [mm]}) \times (H + 100 \text{ mm} + 2 \cdot s \text{ [mm]})$
- Mortar gap for wet installation $s \geq 25 \text{ mm}$.
- Gap for mineral wool filling $s = 10$ to 25 mm .
- Calcium silicate support bearings with the dimensions $100 \text{ mm} \times 100 \text{ mm} \times 25 \text{ mm}$ for gaps $s = 25 \text{ mm}$ are included in delivery. Support bearings must always be used as supports when performing dry installation with mineral wool in walls, and as centring devices in ceilings. In other circumstances, support bearings can be used as installation aids, except in metal stud walls.

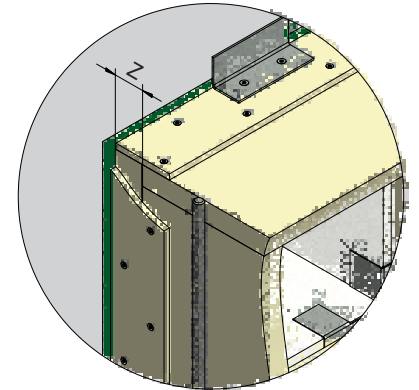
EK90 smoke control dampers

Installation in rigid walls and ceilings (2) Attachment with shear protection brackets A and B

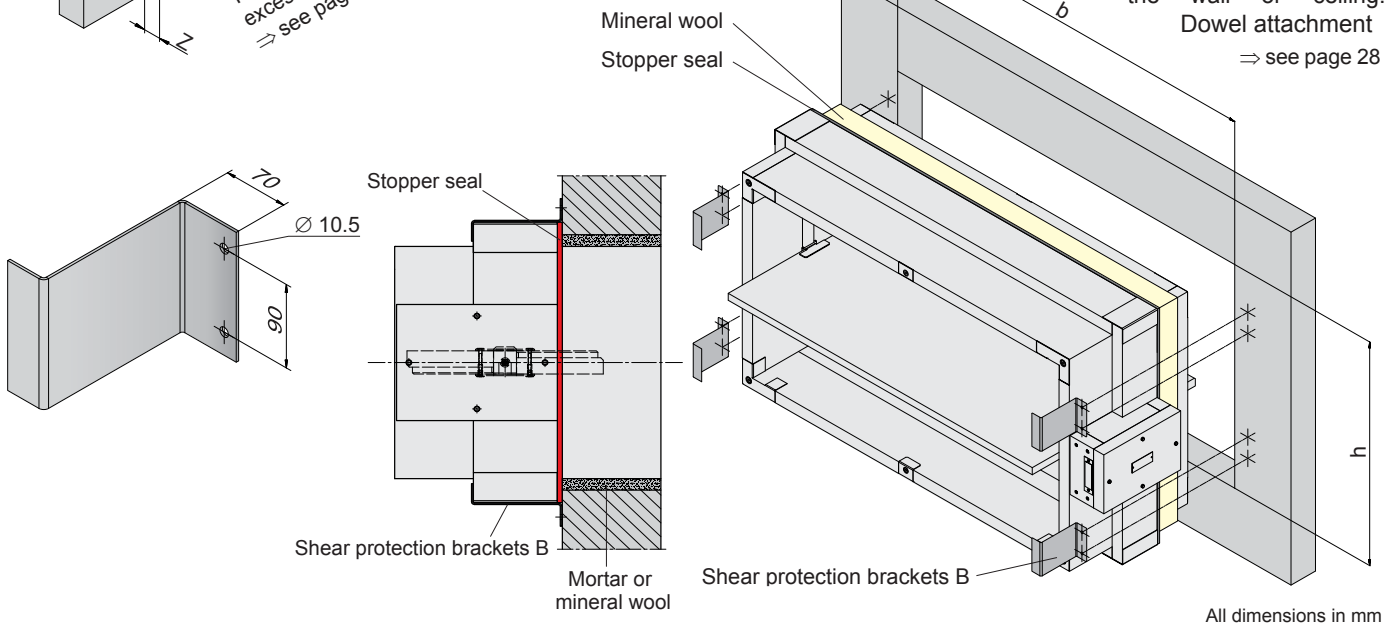
Shear protection brackets A are fitted onto the non-drive operation (rear) of the smoke control damper and are attached to the casing or the smoke extraction duct with 2 drywall screws measuring 6 x 50 mm.



Shear protection brackets A can also be fitted to flashing strips on connected smoke extraction ducts.



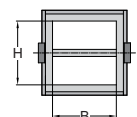
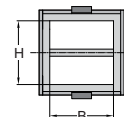
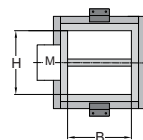
Shear protection brackets B are fitted onto the operation-side (front) of the smoke control damper and are attached using M8 threaded rods and nuts that pass through the wall or ceiling. Dowel attachment => see page 28



Number and arrangement of shear protection brackets A and B

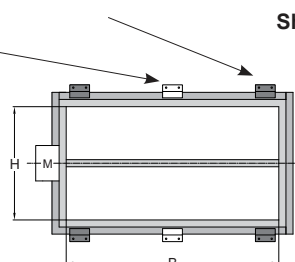
EK90 smoke control dampers in the sizes B x H

- up to a maximum of 450 mm x 450 mm each damper features 1 shear protection bracket at the centre of the two B-sides or the two H-sides.
- with $B > 450$ mm or $H > 450$ mm each damper features 2 shear protection brackets, one on each end of the B-sides or the H-sides.

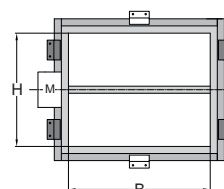


lengths $L > 600$ mm, each damper features 1 additional shear protection bracket at the centre of the B- or H-sides.

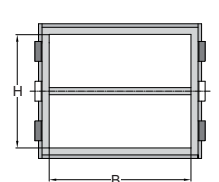
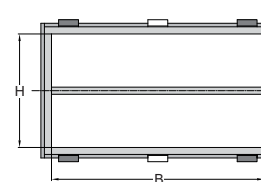
Shear protection brackets A and B can also be used in combination, while retaining the same total number of brackets!



Shear protection brackets B
View of the front side

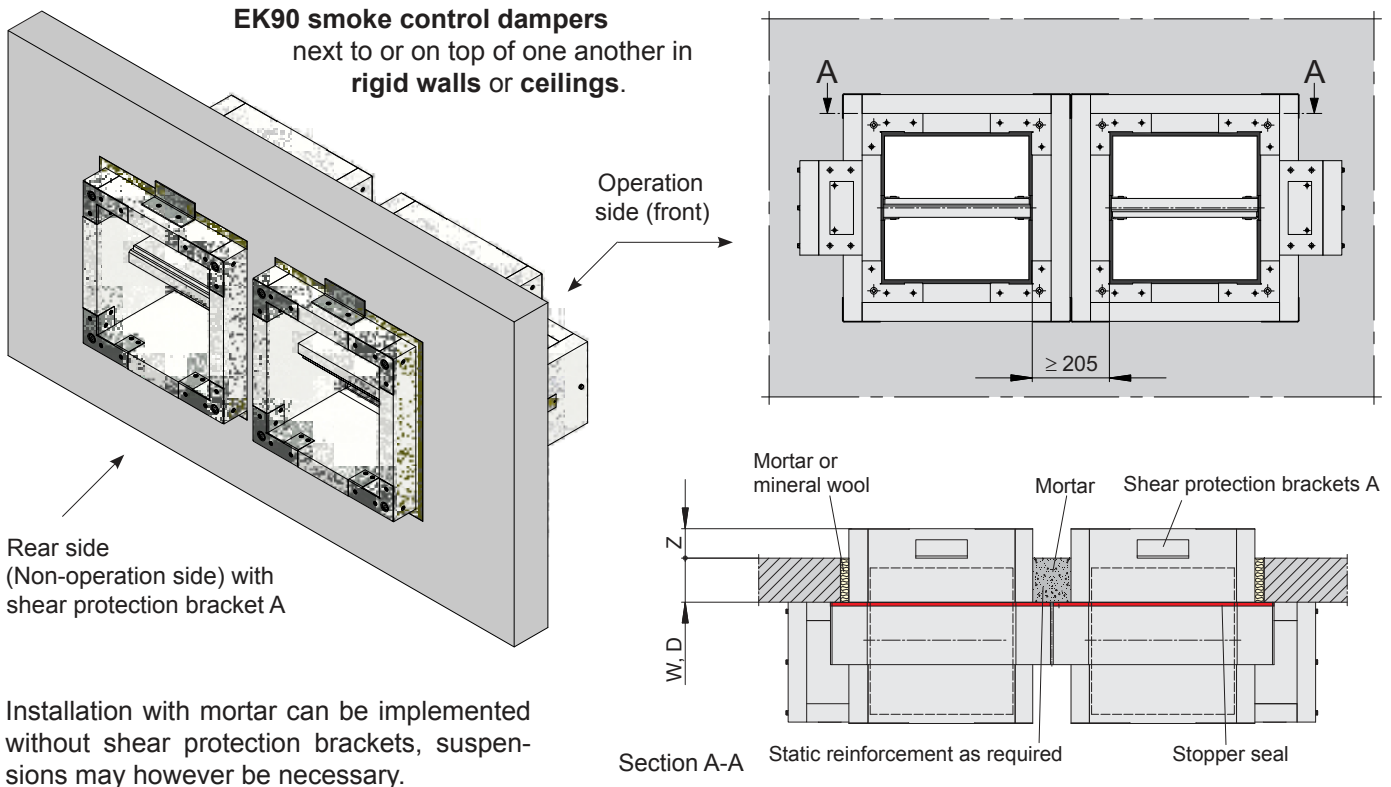


Shear protection brackets A
View of the rear side



EK90 smoke control dampers

Installation in rigid walls and ceilings (3)



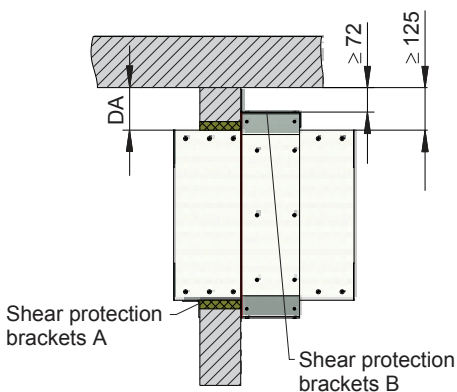
Installation with mortar can be implemented without shear protection brackets, suspensions may however be necessary.

EK90 smoke control dampers underneath rigid ceilings

Installation gaps $s \leq 25$ mm can be filled with mineral wool. Otherwise, installation gaps should be completely filled with mortar!

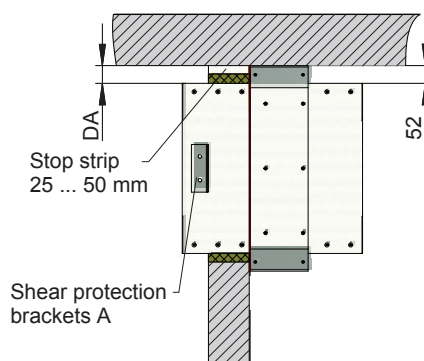
Shear protection brackets are required for installation with mineral wool, but can be omitted for installation with mortar!

Installation under a rigid lintel



- Spacing $DA \geq 180$ mm:
Shear protection brackets A and B can also be used above, below and laterally; and combined as A and B.
⇒ see page 19
- Spacing $DA \geq 125$ mm up to ≤ 180 mm:
Shear protection brackets A can be used laterally, and shear protection brackets B above and below.

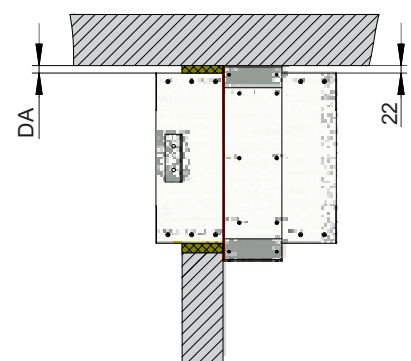
Installation with small spacing



- Spacing $DA \geq 52$ mm up to ≤ 125 mm:
Shear protection brackets A or B can be used laterally.
Depending on the spacing DA , thick filling strips from 25 to 75 mm, made from calcium silicate boards, are required with approx. ≥ 500 kg/m³ bulk thickness.
They should be fastened to the ceiling with screws or bolts with a diameter of 5 mm or more.

Installation of NL or NR versions

⇒ see page 29



- Spacing $DA = 22$ mm:
Shear protection brackets A or B can be used laterally.

All dimensions in mm

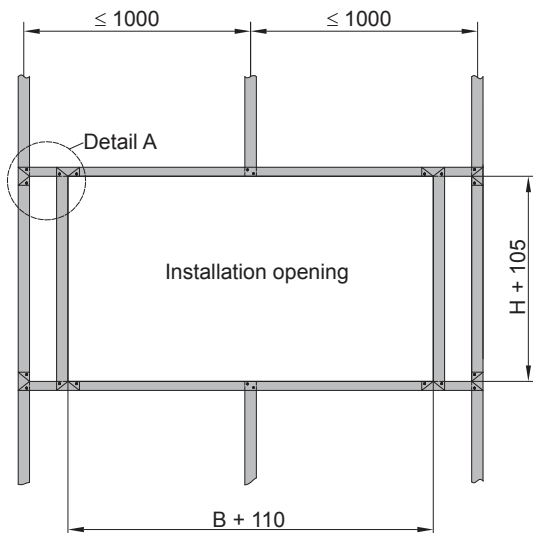
EK90 smoke control dampers

Installation in flexible walls (1) Metal stud walls, including fire walls

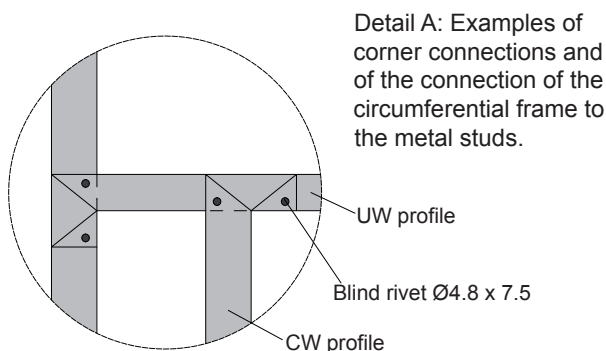
Installation in flexible walls in the form of metal stud walls with cladding on both sides and a thickness from 95 mm and stud spacing up to 1000 mm is performed as dry installation.

EK90 smoke control dampers are used in circumferential frames made from wall profiles, in accordance with the thickness of the wall. The frames must be connected and fixed to the studding.

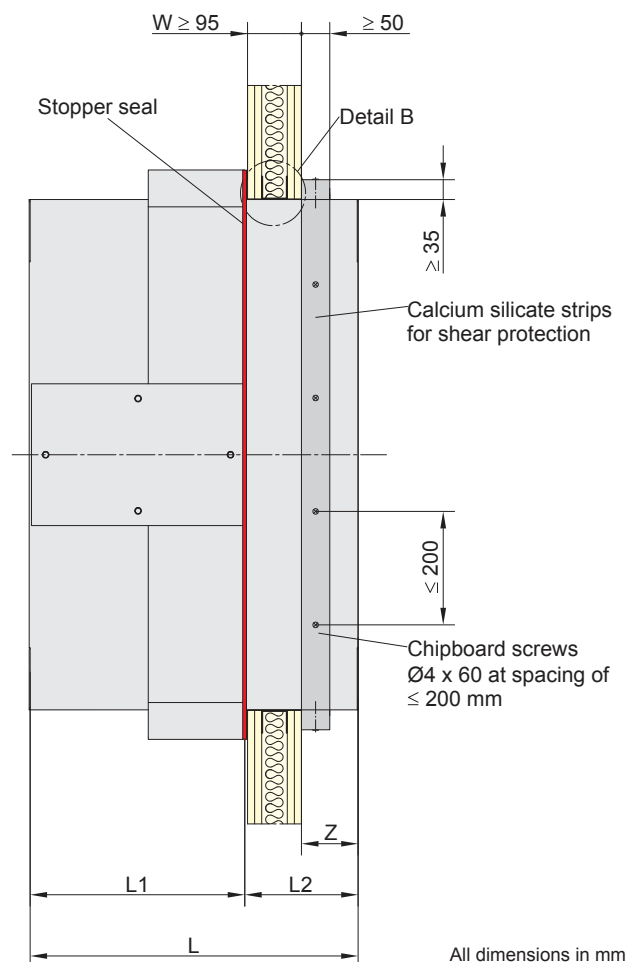
Installation can be performed in a horizontal or vertical axis position. → see page 33



Example of an **installation opening** in metal studs
 $b \times h = (B + 110 \text{ mm}) \times (H + 105 \text{ mm})$



Detail A: Examples of corner connections and of the connection of the circumferential frame to the metal studs.



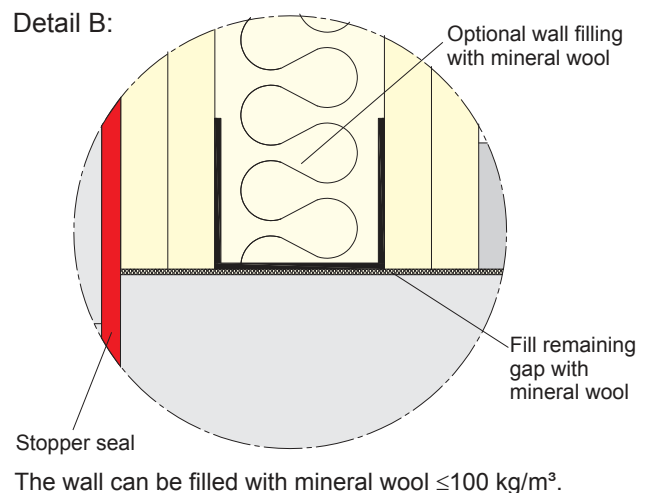
All dimensions in mm

Shear protection strips must be produced on site using calcium silicate boards with approximately $\geq 500 \text{ kg/m}^3$. Cuts of $\geq 50 \text{ mm}$ width and 35 mm height are suitable. They must be glued on circumferentially around the non-operation side (rear) of the smoke control damper and screwed down at spacings of $\leq 200 \text{ mm}$. Where access is limited under ceilings or on walls, strips must be attached on at least the two opposing horizontal or vertical sides!

For the length L of the smoke control dampers, excess lengths of $Z \geq 70 \text{ mm}$ are required to fit the strips, or excess lengths of $Z \geq 100 \text{ mm}$ if smoke extraction ducts with fire resistance period are being connected.

→ see page 4

Installation in flexible walls must be implemented with shear protection strips! The shear protection brackets A and B cannot be used for this type of installation!



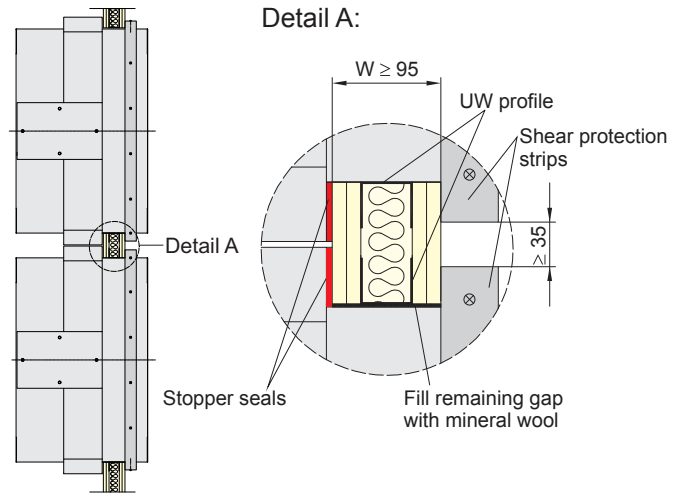
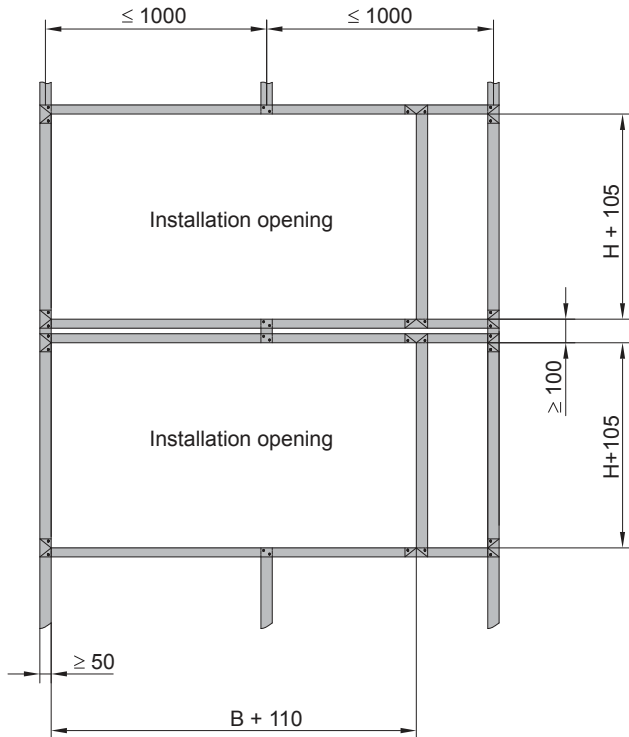
The wall can be filled with mineral wool $\leq 100 \text{ kg/m}^3$.

In metal stud walls in the form of **fire walls**, stud profiles should be used with a 2 mm wall profile (UA profile), either directly on either side of the smoke control dampers or in the area of the smoke control dampers, depending on the structural constraints.

EK90 smoke control dampers

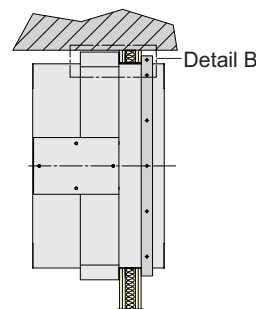
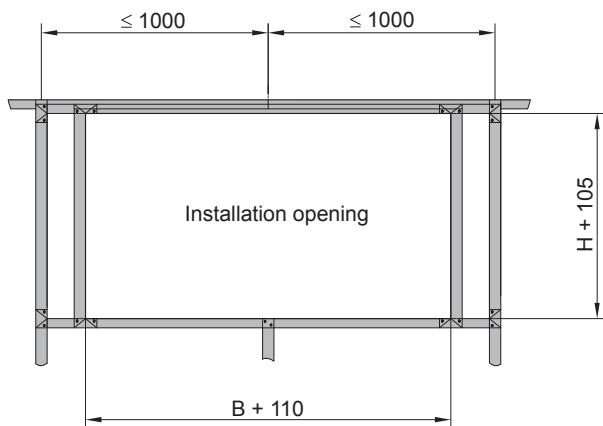
Installation in flexible walls (2) Metal stud walls

EK90 smoke control dampers either directly next to or on top of one another in **metal stud walls** with cladding on both sides.

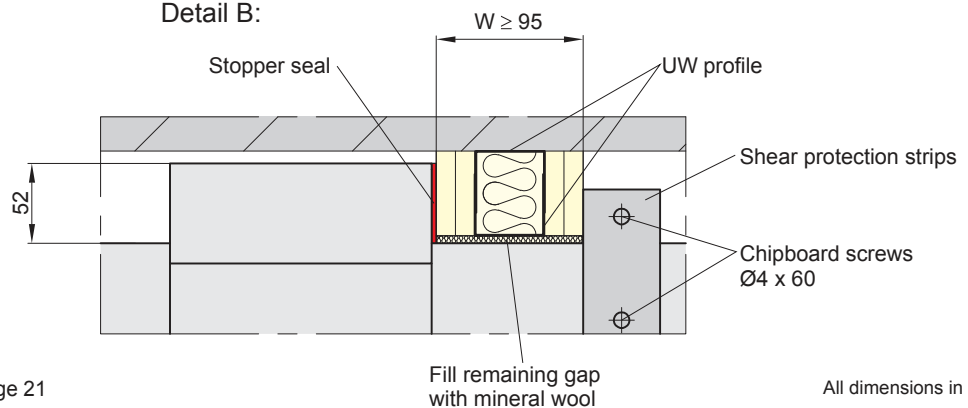


Example: Installation of two EK90 smoke control dampers directly on top of one another. Installation of the dampers directly underneath one another is performed in the same way.

EK90 smoke control dampers in metal stud walls with cladding on both sides, directly adjoining rigid walls and ceilings.



Detail B:



The 52 mm spacing can be reduced to 22 mm when using the NL or NR versions!
 ⇒ see pages 29 and 34.

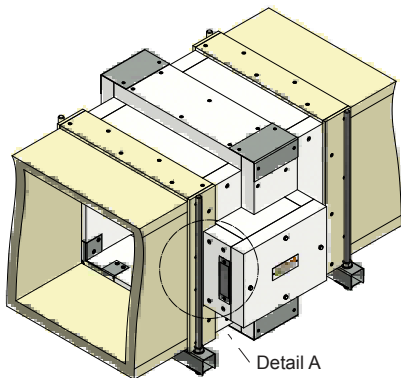
Shear protection strips ⇒ see page 21

All dimensions in mm

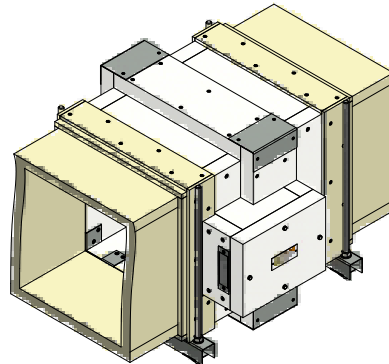
EK90 smoke control dampers

Installation between smoke extraction ducts and connections

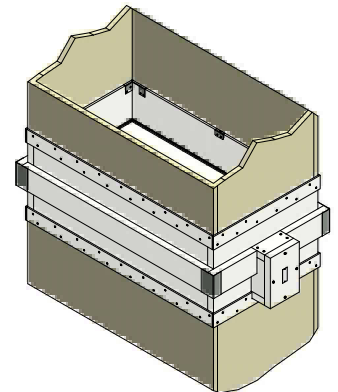
Connecting smoke extraction ducts made of wall boards with fire resistance period



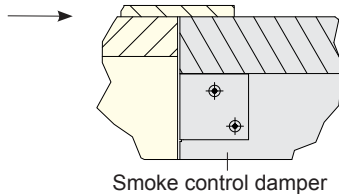
Connect the smoke extraction duct without filling strips.



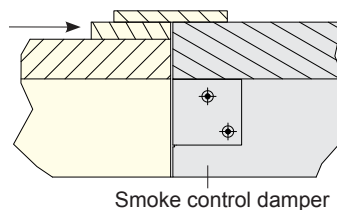
Connect the smoke extraction duct with filling strips made from duct-specific materials.



Connect vertical smoke extraction ducts as shown, with or without filling strips made from duct-specific materials.

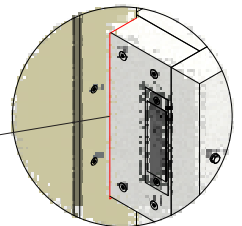


Smoke control damper



Smoke control damper

Detail A
Notching the flashing strip in the area of the motor cover

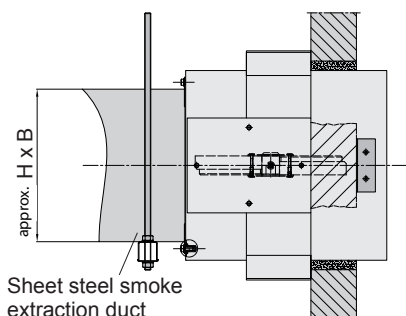
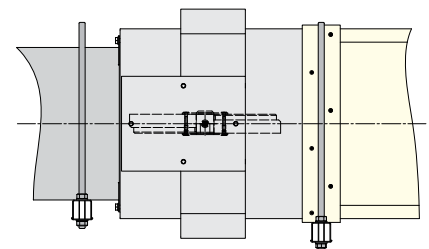
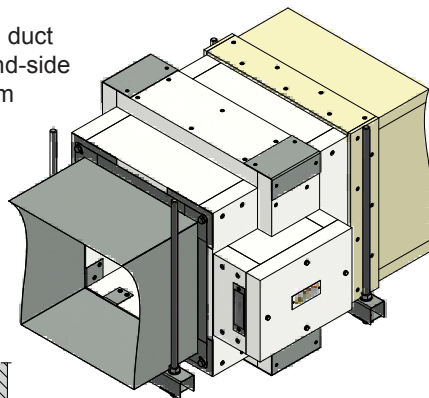


For information on the suspension or attachment of the smoke control dampers → see page 28

Connecting the sheet steel smoke extraction duct and protective grille

Example

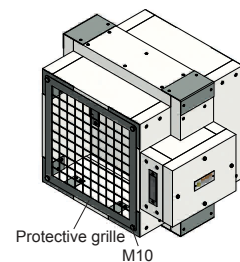
Left-hand-side smoke extraction duct made from sheet steel, right-hand-side smoke extraction duct made from wall boards (with fire resistance period).



Sheet steel smoke extraction duct

Hexagon screw M10
Washer M10

Connection flange for smoke extraction duct



Protective grille M10

- The connection flanges of the smoke extraction ducts and protective grilles can be screwed directly onto the smoke control dampers.
- The freedom of movement of the damper blade should be taken into account when mounting the protective grilles.

⇒ see damper blade excess length on page 4

Extensions in the form of smoke extraction ducts made from sheet steel should be used as required.

All dimensions in mm

EK90 smoke control dampers

Lateral mounting on smoke extraction ducts (1)

EK90 smoke control dampers can be fitted to the side of smoke extraction ducts with fire resistance period and a wall thickness of ≥ 35 mm.

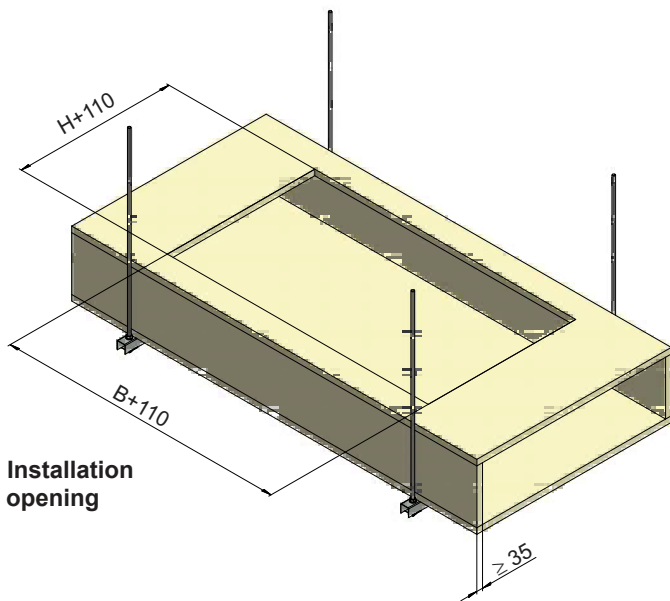
The EK90 smoke control dampers can be mounted in a horizontal or vertical axis position. → see page 33

The damper blade should ideally be positioned parallel to the direction of flow or outside of the flow, so as to avoid any interfering forces.

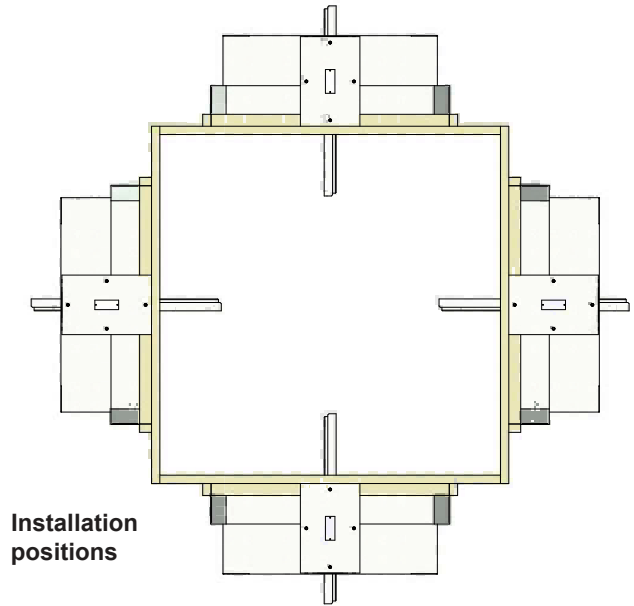
The smoke extraction ducts can be aligned horizontally or vertically, and must be designed and fitted in accordance with the manufacturer's specifications.

The screw sizes specified in the following drawings relate to smoke extraction ducts with a thickness of 35 mm. The screw lengths should be adapted in the case of greater thicknesses.

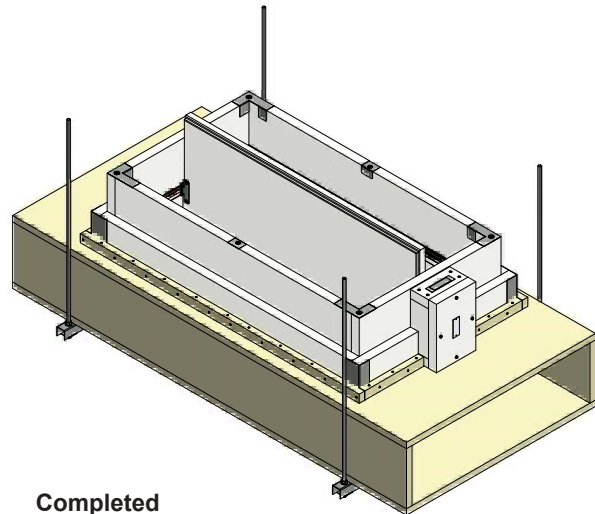
Mounting on smoke extraction ducts with clear widths $\geq H_{\text{smoke control damper}} + 300$ mm



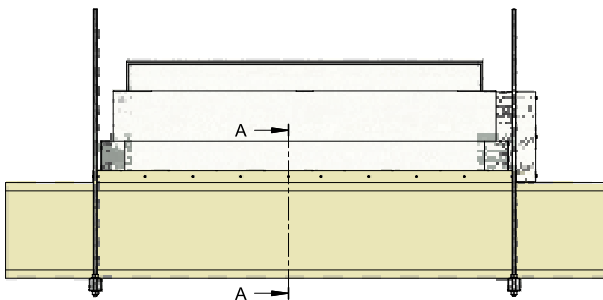
Installation opening



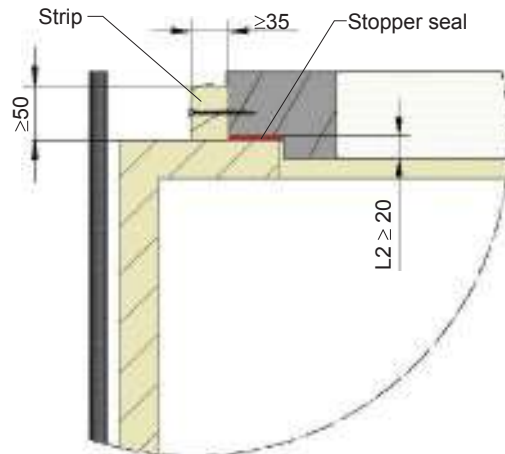
Installation positions



Completed installation



Longitudinal view



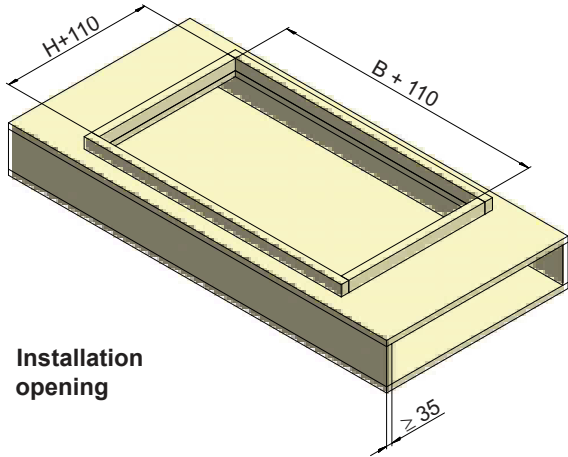
Strips must be produced from duct-specific materials, glued to the smoke extraction duct and screwed on using chipboard screws with a diameter of 4 x 80 at spacings of ≤ 200 mm. The smoke control dampers must be screwed on in the same way, but using chipboard screws with a diameter of 4 x ≥ 60 .

All dimensions in mm

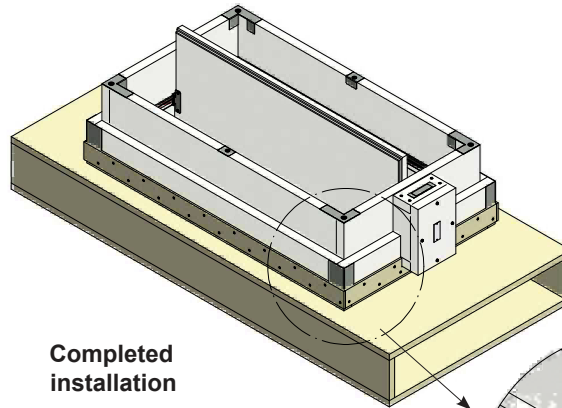
EK90 smoke control dampers

Lateral mounting on smoke extraction ducts (2)

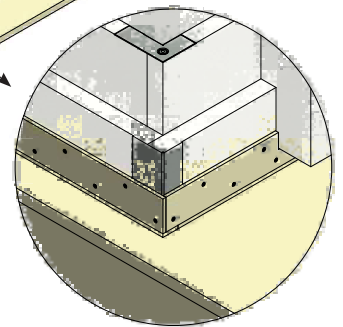
Mounting on smoke extraction ducts with clear widths $\geq H_{\text{smoke control damper}} + 300$ mm. This installation version allows for mounting at a maximum offset of 70 mm. Flashing strips are then used for assembly.



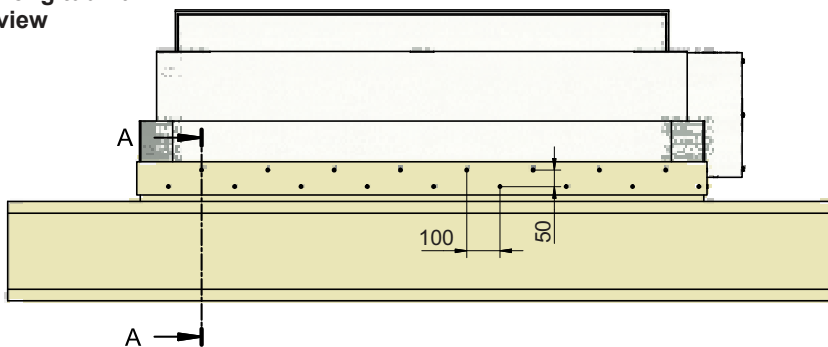
Installation opening



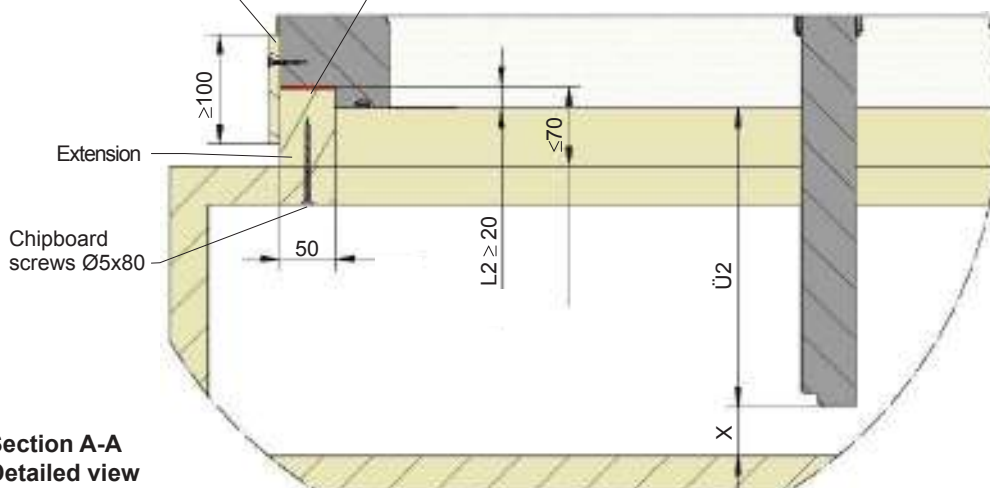
Completed installation



Longitudinal view



Flashing strip Stopper seal



Section A-A
Detailed view

Damper blade excess length $\ddot{U}2 \Rightarrow$ see page 4

Spacings of $x \geq 20$ mm must remain between the opened damper blade and the casing wall.

Extensions must be produced from duct-specific materials in the cross-section 50 mm x ≤ 70 mm, glued to the smoke extraction duct and screwed on using chipboard screws with a diameter of 5 x 80 at spacings of ≤ 160 mm.

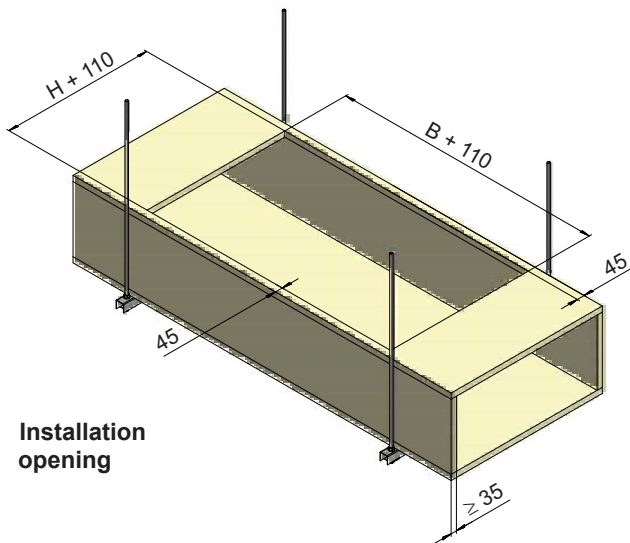
Flashing strips must be produced from duct-specific materials, glued to the smoke extraction duct and the smoke control damper, and screwed on using chipboard screws with a diameter of 4 x 80 at spacings of ≤ 200 mm.

All dimensions in mm

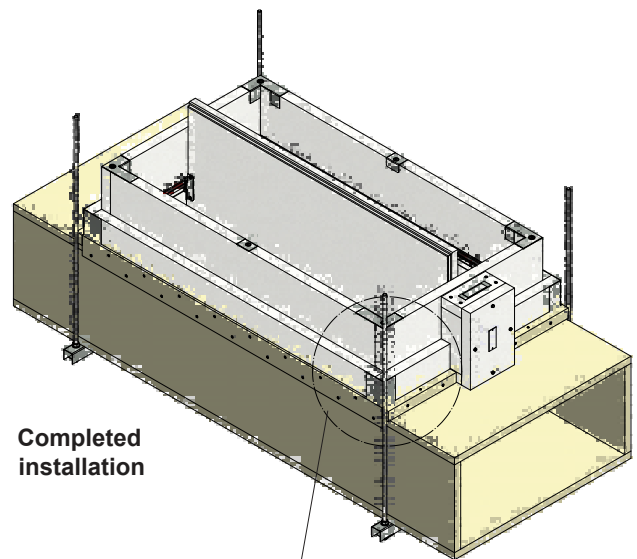
EK90 smoke control dampers

Lateral mounting on smoke extraction ducts (3)

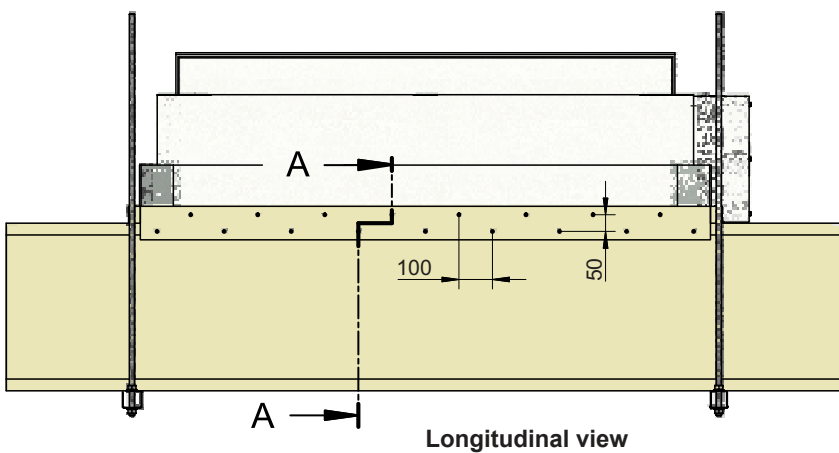
Mounting on smoke extraction ducts with clear widths $\geq H_{\text{smoke control damper}} + 130 \text{ mm}$



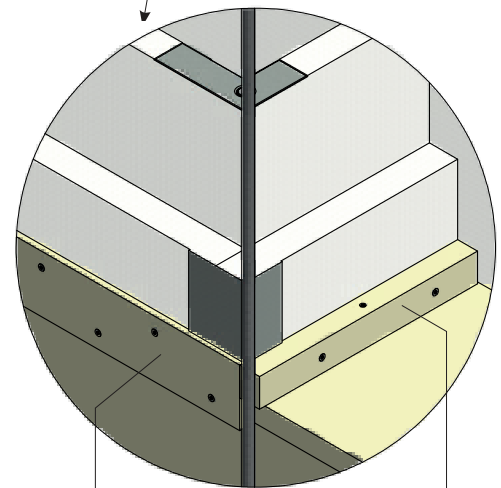
Installation opening



Completed installation



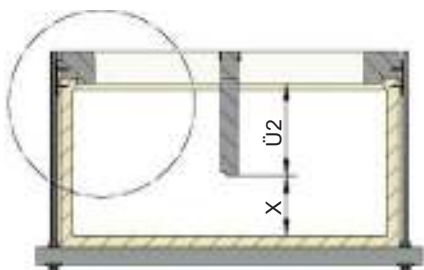
Longitudinal view



Flashing strip

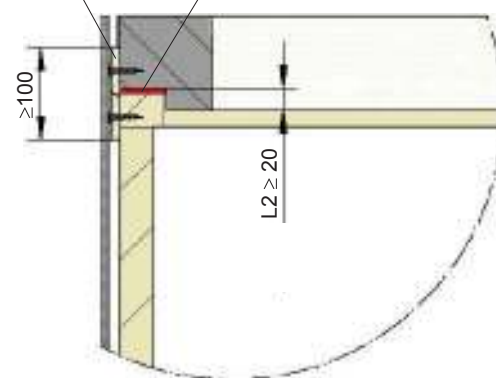
Strip

Section A-A



Flashing strip

Stopper seal



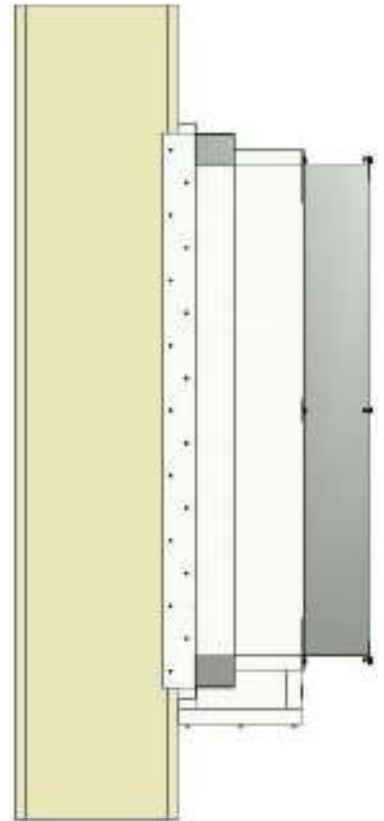
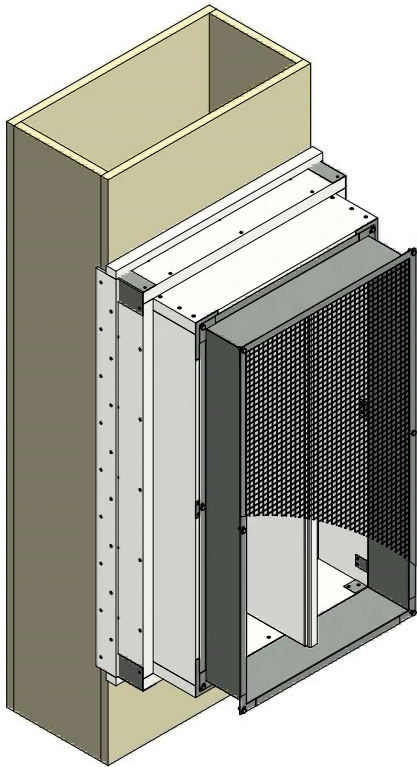
Damper blade excess length $\ddot{U}2 \Rightarrow$ see page 4
 Spacings of $x \geq 20 \text{ mm}$ must remain between the opened damper blade and the casing wall.

All dimensions in mm

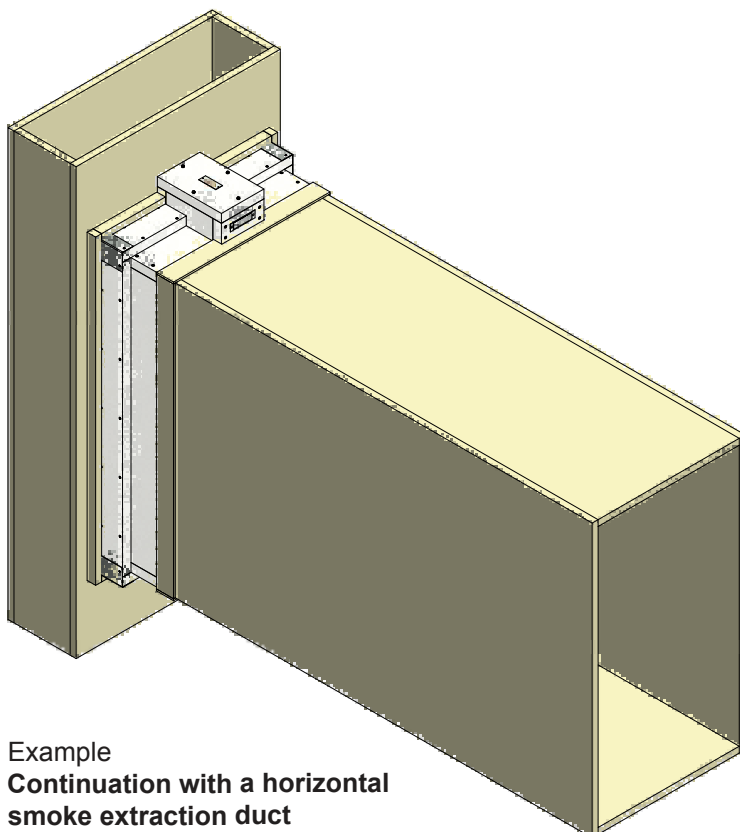
EK90 smoke control dampers

Lateral mounting on smoke extraction ducts (4)

Mounting on vertical smoke extraction ducts



Example:
Smoke control damper with protective grille



Example
Continuation with a horizontal
smoke extraction duct

- Smoke control dampers must be connected to vertical smoke extraction ducts in the same way as to horizontal ducts!
⇒ see pages 23 to 26
 - For information on the suspension or attachment of the smoke control dampers
⇒ see page 28
 - The freedom of movement of the damper blade should be taken into account when mounting the protective grilles.
⇒ see damper blade excess length on page 4
- Extensions in the form of smoke extraction ducts made from sheet steel should be used as required.

All dimensions in mm

EK90 smoke control dampers

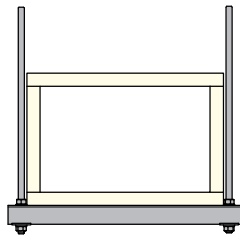
Fire-resistant suspensions and attachments

Dimensioning of beams in accordance with DIN 4102-4

Maximum permissible weights **G** on suspensions with steel threaded rods with a fire resistance period of 90 to 120 minutes:

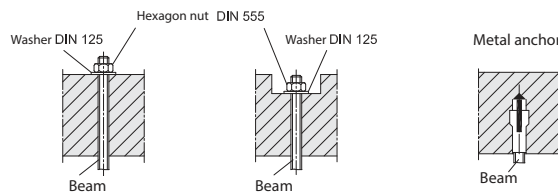
Size	A _s [mm ²]	Weight load G [kg]	
		For 1 unit	For 1 pair
M8	36.6	22	44
M10	58.0	35	70
M12	84.3	52	104
M14	115	70	140
M16	157	96	192
M18	192	117	234
M20	245	150	300

A_s: Tensile stress cross-section according to DIN 13



- Beams must fit tightly against the walls of the smoke extraction ducts or on the casing of the smoke control dampers. Otherwise, they will need to be clad. This also applies to beams that are larger than 1.5 m in length.
- Traverses should be at least U50 according to DIN 1026.
- Shims should be used as required.

Attachment of beams in rigid ceilings

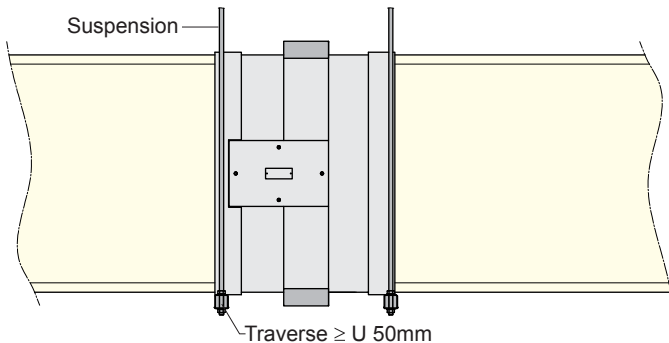


Dowels must be suitable and approved for fire protection, and installed accordingly.

Example:

Suspension of an EK90 smoke control damper together with connected smoke extraction ducts.

Weights of EK90 smoke control dampers → see page 17



Attach shear protection brackets B with dowels.

→ see page 19

Plugs are required for a fire resistance period of 90 minutes.

The following can be used for the various materials:

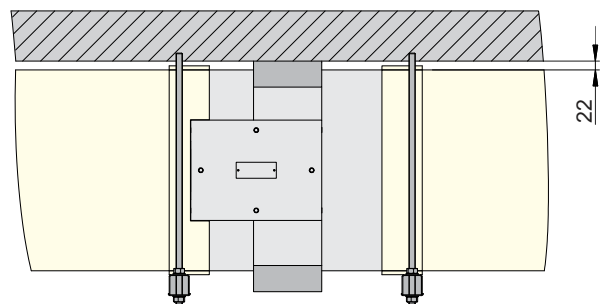
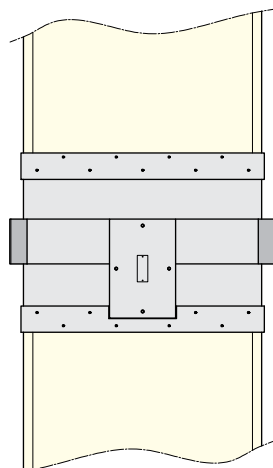
- **Concrete:**
Fischer bolt anchor FAZ - II 8
- **Aerated concrete:**
Fischer anchor M8 FPX - I
- **Concrete, aerated concrete, masonry:**
Fischer injection mortar systems FIS V, VW, VS together with the anchor rods FIS A – M8
Shims should be used if required.

Example

EK90 smoke control dampers between vertical smoke extraction ducts are generally supported by the lower sections of the smoke extraction duct.

Fastenings for the smoke control dampers must therefore match the fastenings for the smoke extraction ducts.

The specifications of the smoke extraction duct manufacturer must be observed.



Example

EK90 smoke control dampers in versions NL or NR directly underneath ceilings. → see page 29

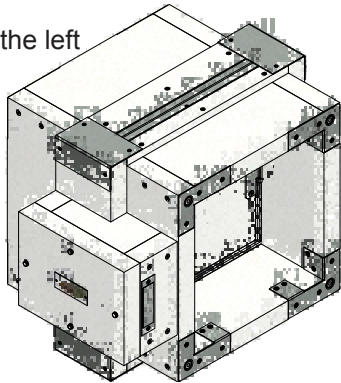
The specifications of the smoke extraction duct manufacturer must be observed.

EK90 smoke control dampers

Option: NL and NR versions for reducing spacing underneath rigid ceilings

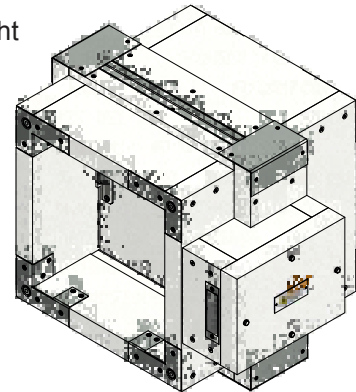
NL Version

Motor drive on the left

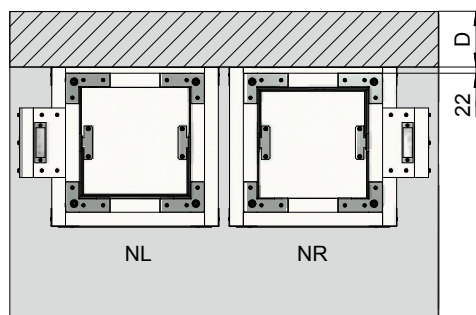
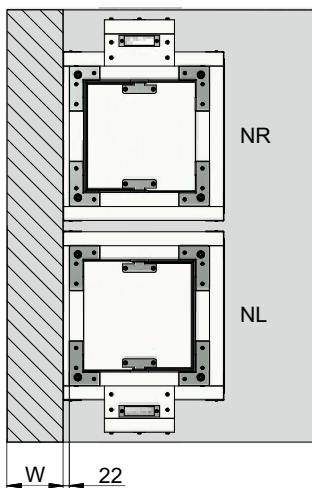


NR Version

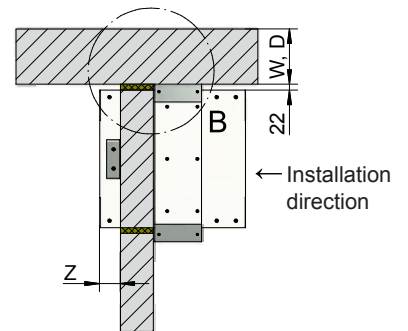
Motor drive on the right



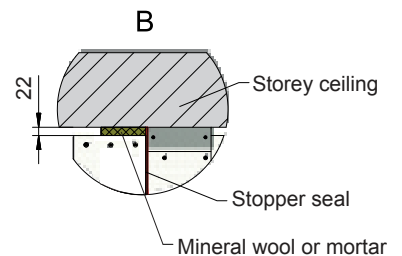
Installation in rigid walls



View of the operation side (in direction of installation)

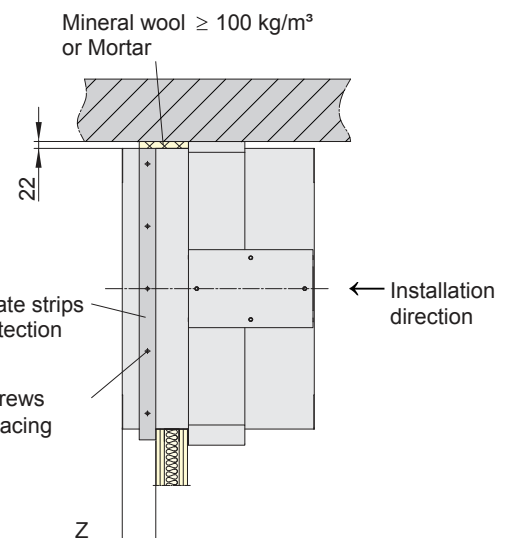
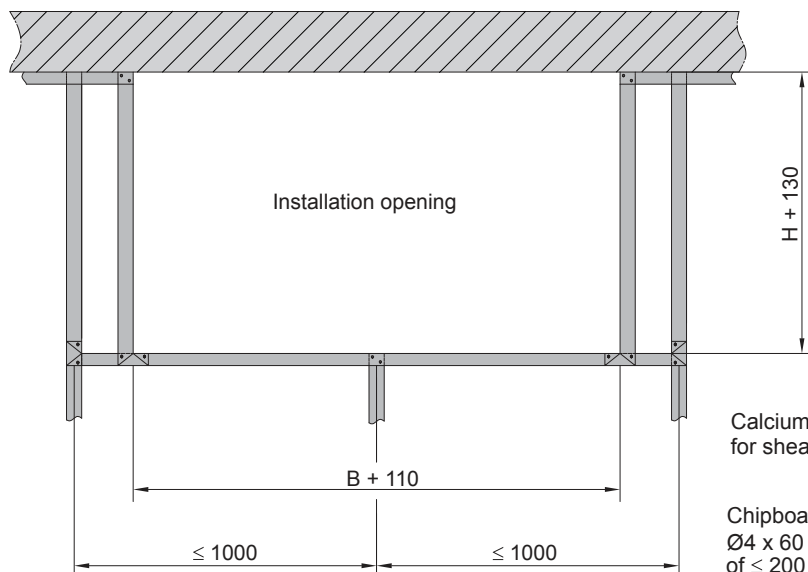


Details for installation and shear protection brackets
 ⇒ see pages 18 to 20



When damper blades are positioned vertically, versions NL and NR can also be positioned vertically on a solid wall.

Installation in metal stud walls



Details for installation and strips for shear protection
 ⇒ see pages 18 to 20

EK90 smoke control dampers

Electrical connection (1) motor drives

The **electric drive** is located to the side of the smoke control damper, inside the calcium silicate **casing**.

The motor drive can be accessed by unscrewing the casing cover. Electrical cables should be guided through the walls of the casing for the motor drive on site.

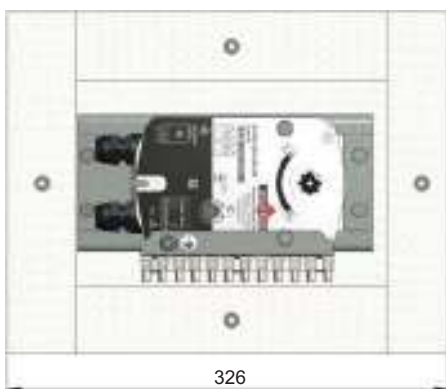
Holes should be arranged for these as shown and matched to the diameter of the cables.

Depending on the height H of the smoke control damper, motor drives with difference performance data can be fitted:

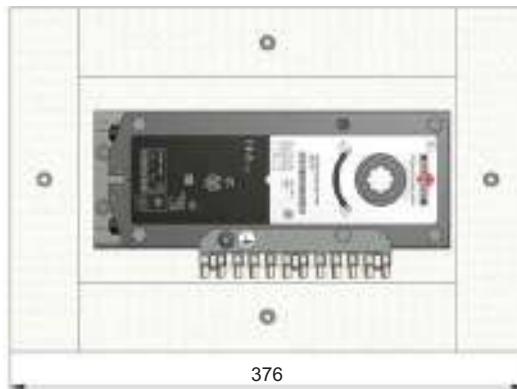
Motor drive	M1 24 V AC/DC	M2 230 V AC
Standard design		
Height $H \leq 450$ mm	7.5 W / 9 VA	5 W / 12 VA
Height $H > 450$ mm	12 W / 18 VA	8 W / 15 VA
Special design of electrical connection	12 W / 18 VA	8 W / 15 VA

Protection class IP54, runtime: ≤ 60 s

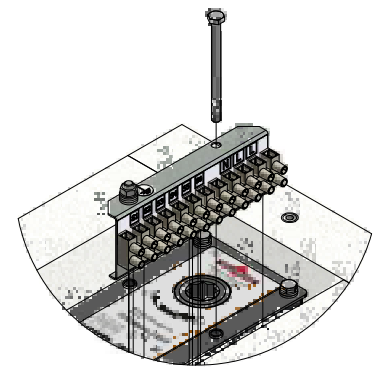
Motor drives for EK90 smoke control dampers, shown with the optional terminal strip for easy electrical connection.



Motor drive for standard design with heights $H = 200$ to 450 mm



Motor drive for standard design with heights $H > 450$ up to 800 mm and for special design of electrical connection



Option: terminal strip for electrical connection.

Electrical connection
Motor drives M1
24 V AC/DC

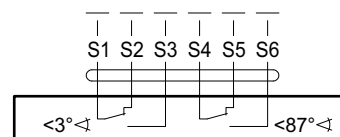


- 1 = Ground neutral
- 2 = Rotation direction "OPEN"
- 3 = Rotation direction "CLOSED"

Electrical connection
Motor drives M2
230 V AC

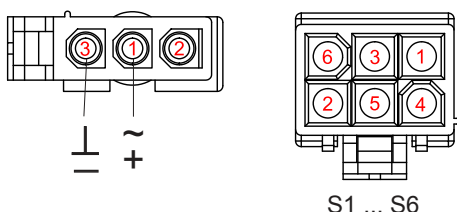


Limit switch assignment S1 to S6



Schematic circuit diagram:
Limit switch for "CLOSED position" actuated in $< 3^\circ$ angle position, smoke control damper is in "CLOSED position".

- The limit switch for the "CLOSED position" (S1 contact with S2) of the smoke control damper is actuated at angle position $< 3^\circ$.
- The limit switch for the "OPEN position" (S4 contact with S6) of the smoke control damper is actuated at angle position $\geq 87^\circ$.
- The intermediate position is signalled in angle position $> 3^\circ$ and $< 87^\circ$ (S1 contact with S3 and S4 contact with S5).



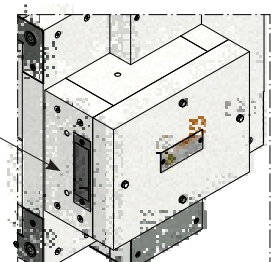
Configuration of AMP connectors on motor drives 24 V AC/DC

Casing for the motor drive

Recommended **hole positions** for inserting the electrical **cables** are labelled at the factory.

Required holes should be produced as required on site.

Hole diameter = cable diameter



Additional casing for control units \Rightarrow see page 32

EK90 smoke control dampers

Electrical connection (2) Notes for electrical installation and power supply

Notes for electrical installation

- Smoke control dampers should also be able to open and close when exposed to fire.
- For this reason, an electrical power supply functions in the event of fire and has suitable connection cables up to the smoke control dampers is a requirement.

Electrical cables, class E90, with functional integrity of 90 minutes should be used. The minimum requirement is functional integrity of 30 minutes and classification E30.

However, the classification tests relate only to short-circuit resistance and power failure in the event of fire though.

- The electrical resistance in the connection cable increases when exposed to fire because of the increased temperature; up to 2.6-fold after 30 minutes and up to 4.6-fold after 90 minutes. As a result, the electrical voltage drop increases while the remaining voltage on the motor drives falls.

When dimensioning the connection cables, this should be factored in with large cross-sections, shorter lengths or a higher electrical operating voltage accordingly.

The same applies to connection cables for operating voltages with multiplexed data transmission; for example, AS-i and other BUS systems.

Otherwise, smoke control dampers could not open or close as they are supposed to in the event of fire.

- Correct dimensioning of the connection cables and operational safety of data transmission cannot be stressed enough! Likewise, attention must be paid to the prescribed type of laying and installation for electrical cables and their functional integrity!
- It is generally recommended that smoke control dampers be used for 230 V AC and connected via E90 cables with 1.5-mm² conductor cross-section.

The length of said E90 cables can be 250 m or more. Otherwise, only short connection cables may be possible.

Additional switching equipment should be installed in a fireproof room or switch cabinet.

Power supply

- Mechanical **systems for smoke extraction** require a reliable power supply in the event of fire.

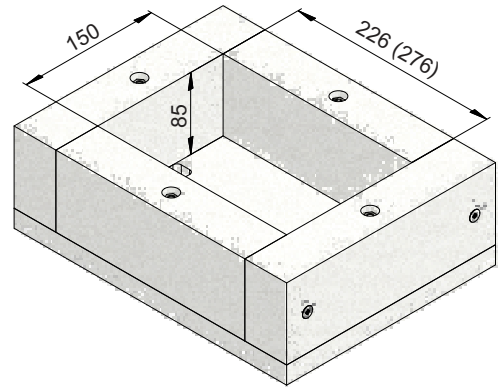
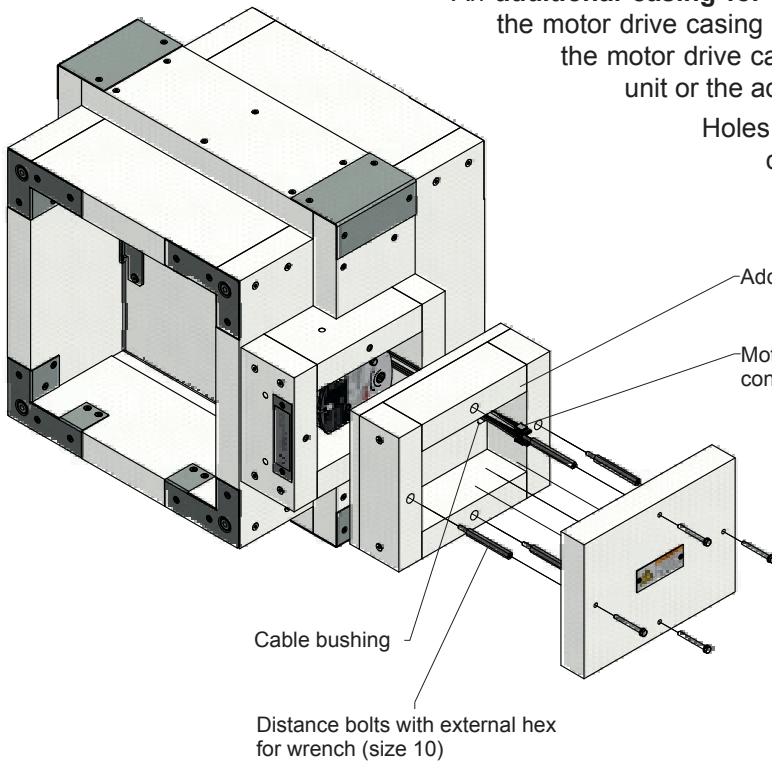
A power supply, as provided by power generation equipment (backup power), in addition to the public power grid conforms to requirements under public law.

EK90 smoke control dampers

Electrical connection (3) *Option: Additional casing for control units*

An **additional casing for the extra control units** can be installed between the motor drive casing and its removable cover. The connection cables of the motor drive can be guided into this and connected to the control unit or the additional electrical cables.

Holes for cables drawn through the walls of the extra casings can be produced on site.

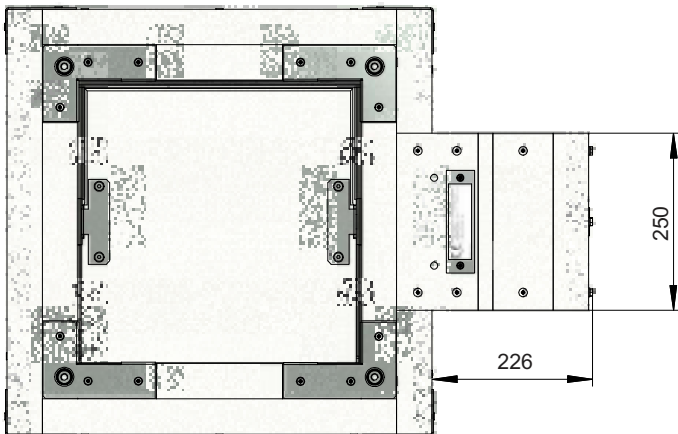


The clear dimension of the additional casing depends on the type of EK90 smoke control damper:

Design	Heights H [mm]	Clear dimension [mm]
Standard design	$H \leq 450$	226
	$H > 450$	276
Special design of electrical connection	all	276

These additional casings can also be retrofitted on site on request! They should then be ordered with either dimension 226 or 276!

On request: Designs different to clear dimension = 85 mm.



Please observe notes for the laying and dimensioning of cables!

⇒ see page 31

EK90 smoke control dampers

Function in smoke extraction systems - installation - functional testing/servicing

Function of smoke extraction systems with EK90 smoke control damper, Series EK92

- EK90 smoke control dampers, Series EK92, are suitable for smoke extraction systems and for combined systems for smoke extraction and building ventilation. They supersede the former EK90 smoke control dampers in accordance with approval Z-78.2-7 and EK90 smoke control dampers with ventilation function in accordance with approval Z-78.3-104.
- EK90 smoke control dampers, series EK92, in **systems only for smoke extraction** are usually closed. In the event of fire, all of them or only those required can be opened from the outset. As the fire develops and smoke is released, other ones can be opened and the previously opened ones can be closed again.
- EK90 smoke control dampers, Series EK92, required for building ventilation in **combined systems for smoke extraction and building ventilation** are usually opened, whereas others are closed. In the event of fire, the smoke control dampers required for smoke extraction are opened or are kept open, while others are closed or remain closed.
- As the fire develops and smoke is released, other EK90 smoke control dampers, series EK92, can be opened and previously opened ones can also be closed. The function with HOT classification is verified.
- EK90 smoke control dampers, series EK92, can still be opened 25 minutes after the onset of full fire exposure. The function with MA classification is verified.

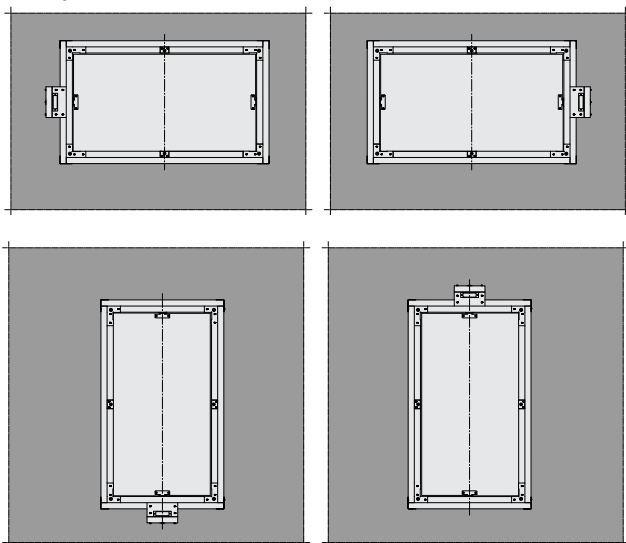
Installation

- **EK90 smoke control dampers, series EK92, must be installed and operated in accordance with this user manual and in compliance with all other regulations.**

In addition, smoke control dampers must be installed tension-free and appropriately aligned.

Air flows in the smoke extraction ducts must not adversely affect the torques acting on the damper blade by the motor.

Installation can be performed in a horizontal or vertical axis position.



Casings should be installed in installation openings in walls such that they lie largely flush on the bottom side. If remaining gaps are filled with mineral wool, a melting point of $\geq 1000^{\circ}\text{C}$ must be verified for this. Shear protection brackets should be installed accordingly.

Structural requirements and concerns, as well as relevant manufacturer's specifications, should be verified and observed by the customer.

- Smoke control dampers for outside air supply must be installed such that heavy moisture penetration is avoided, in particular in the event of frost exposure.
- Assembly, electrical wiring, connections etc. must be produced on site.
- Smoke extraction ducts and electrical equipment must be suitable, and must be correctly installed and connected.
- Inspection openings must be provided on site in the smoke extraction ducts if necessary.

Functional testing/servicing

- In accordance with German regulations, smoke extraction systems must be serviced and kept ready for operation by the owner. The smoke control dampers must be tested for correct functioning at six-month intervals. If successive tests are passed without any defects, the next test may be carried out after one year.
- **Operating instructions** for the EK90 smoke control dampers, Series EK92, are available on the Internet at www.wildeboer.de.

In general, actuating (closing and opening) the smoke control dampers is sufficient in testing the function. This can be performed by means of remote actuation.

EK90 smoke control dampers do not generally require any maintenance work.

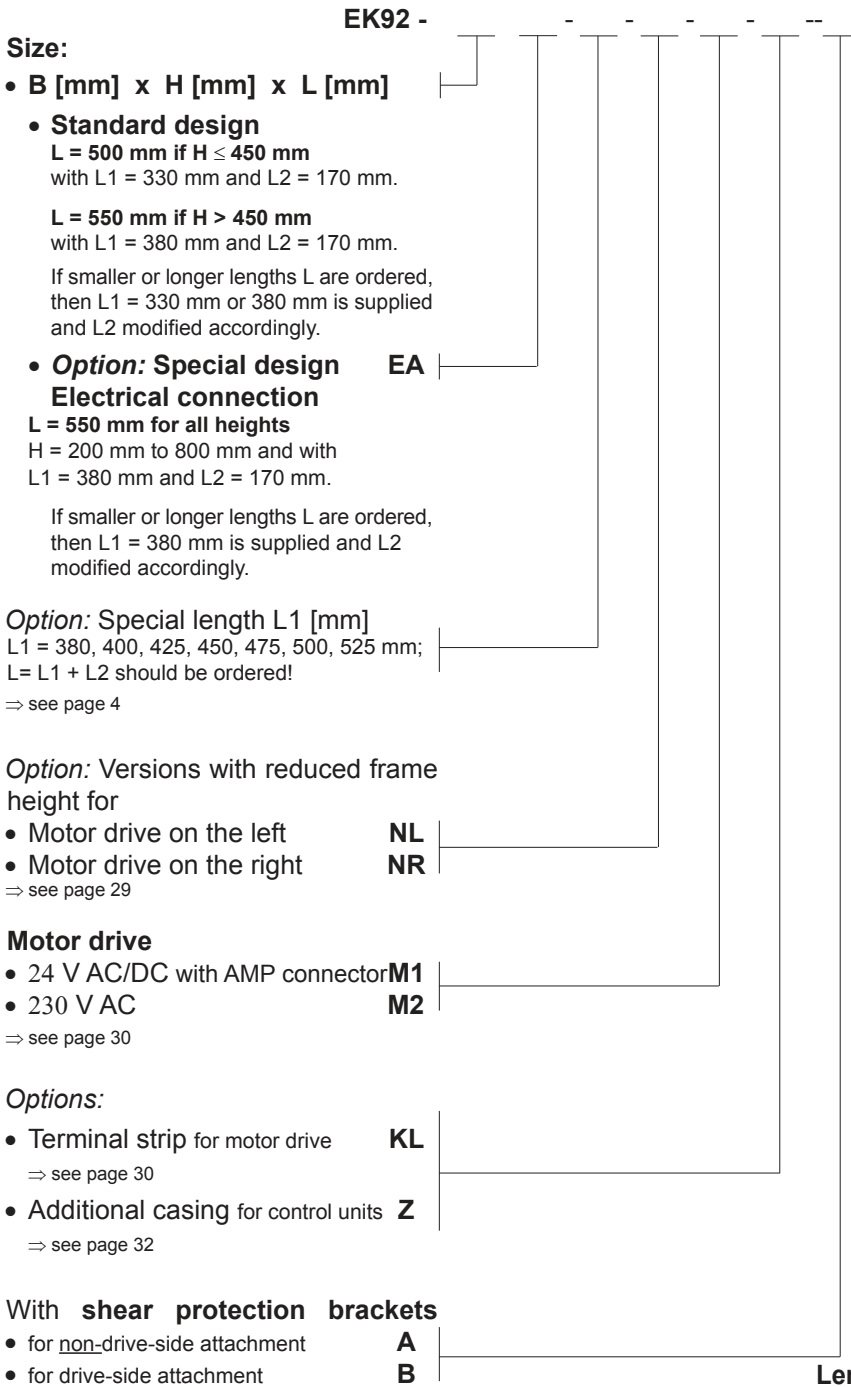
The cleaning of smoke extraction systems should be performed in an operation-dependent manner, and also includes the smoke control dampers.

Repairs or service work are required in the event of malfunctions.

Original spare parts must be used.

EK90 smoke control dampers

Order data



Size:
 • **B [mm] x H [mm] x L [mm]**
 • **Standard design**
 L = 500 mm if H ≤ 450 mm
 with L1 = 330 mm and L2 = 170 mm.

L = 550 mm if H > 450 mm
 with L1 = 380 mm and L2 = 170 mm.
 If smaller or longer lengths L are ordered,
 then L1 = 330 mm or 380 mm is supplied
 and L2 modified accordingly.

• **Option: Special design Electrical connection EA**
 L = 550 mm for all heights
 H = 200 mm to 800 mm and with
 L1 = 380 mm and L2 = 170 mm.

If smaller or longer lengths L are ordered,
 then L1 = 380 mm is supplied and L2
 modified accordingly.

Option: Special length L1 [mm]
 L1 = 380, 400, 425, 450, 475, 500, 525 mm;
 L = L1 + L2 should be ordered!
 ⇒ see page 4

Option: Versions with reduced frame height for
 • Motor drive on the left **NL**
 • Motor drive on the right **NR**
 ⇒ see page 29

Motor drive
 • 24 V AC/DC with AMP connector **M1**
 • 230 V AC **M2**
 ⇒ see page 30

Options:
 • Terminal strip for motor drive **KL**
 ⇒ see page 30
 • Additional casing for control units **Z**
 ⇒ see page 32

With shear protection brackets
 • for non-drive-side attachment **A**
 • for drive-side attachment **B**
 in rigid walls and ceilings;
 otherwise not required.
 Shear protection brackets A are included in
 the delivery as standard!

Part of scope of delivery:
 • 2 x support bearings for gap width s = 25 mm
 • Stopper seal with adhesive
 • 1 set of shear protection brackets A or B, if specifically ordered.

Protective grille made from 1 mm galvanized sheet steel
 with 20 mm mesh size and approx. 70% free cross-section.
 Available dimensions: B x H ⇒ see pages 23 and 27

Available in **5 mm increments:**

- Clear widths **B = 200 mm to 1500 mm**
- Clear heights **H = 200 mm to 800 mm**
- **Lengths:**

L = L1 + L2	
H ≤ 450	H > 450
350 to 850	400 to 850

including

L1	
H ≤ 450	H > 450
330 to 480	380 to 530

and

L2	
H ≤ 450	H > 450
20 to 370	20 to 320



- **lengths** Special design of electrical connection

The length L2 comprises the thickness of the wall W or ceiling D and the casing excess length Z. **L2 = W (D) + Z**
 ⇒ see pages 4, 18, 19, 20 and 21

Generally, shear protection brackets A with Z = 100 mm and strips for shear protection should be mounted on the casing of the smoke control dampers and all smoke extraction ducts should be connected at the same time.
 ⇒ For shorter "Z" dimensions, see page references above!

Lengths for double-sided mounting of protective grilles

Without excess lengths P1 and P2 ⇒ see page 4

for heights H	Length L	Length L1	Length L2
up to 400 mm:	450 mm	330 mm	120 mm
up to 500 mm:	550 mm	380 mm	170 mm
up to 550 mm:	600 mm	400 mm	200 mm
up to 600 mm:	650 mm	425 mm	225 mm
up to 650 mm:	700 mm	450 mm	250 mm
up to 700 mm:	750 mm	475 mm	275 mm
up to 750 mm:	800 mm	500 mm	300 mm
up to 800 mm:	850 mm	525 mm	325 mm

All dimensions in mm

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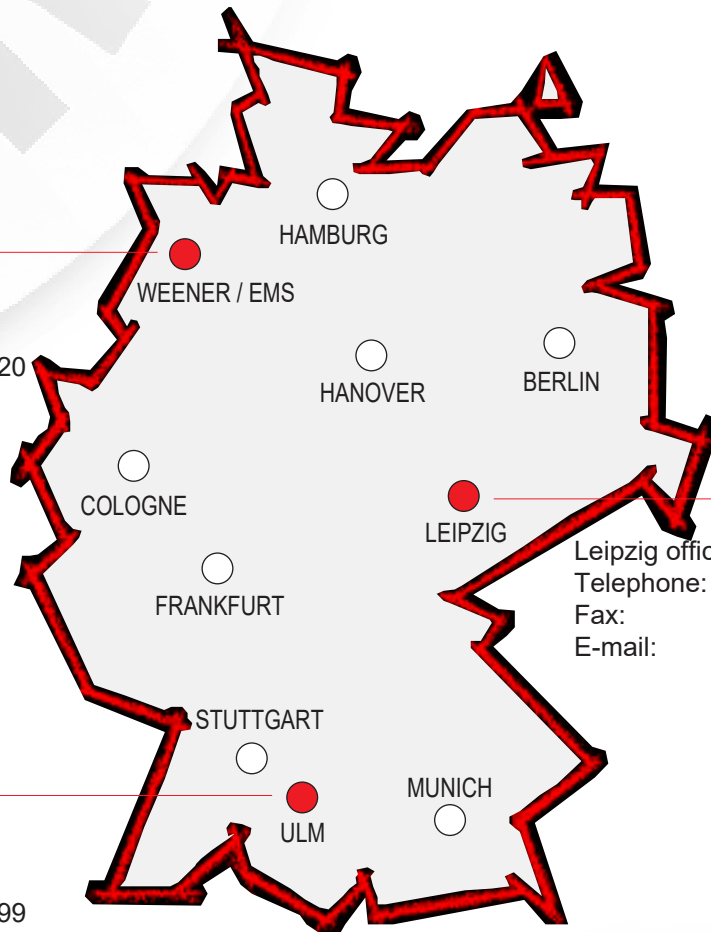
Factory - Administration

Telephone: +49 (0)4951 - 950 - 0

Fax: +49 (0)4951 - 950 - 27120

E-mail: info@wildeboer.de

Internet: www.wildeboer.de
www.wildeboer.eu



WILDEBOER®

Leipzig office

Telephone: +49 (0)34444 - 310 - 0

Fax: +49 (0)4951 - 950 - 27298

E-mail: info@leipzig.wildeboer.de

WILDEBOER®

Ulm office

Telephone: +49 (0)7392 - 9692 - 0

Fax: +49 (0)4951 - 950 - 27299

E-mail: info@ulm.wildeboer.de

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