Doc. no. : 200-24-001

DiEM

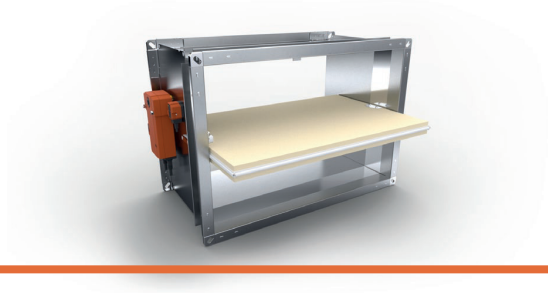
The Art of Ventilation

Soler&Palau Ventilation Group

LPP

Rectangular fire damper

LPP
RECTANGULAR FIRE DAMPER



Product characteristics

A fire damper for general ventilation systems with an electric spring return actuator or a spring mechanism with a thermal fuse.

Intended use

The LPP-E(S) fire dampers are designed for application in general ventilation systems as cut-off partitions separating the fire-engulfed zone from the remaining part of the building (normally open). The purpose of these dampers is to prevent the spread of fire, heat and smoke.

The LPP-E(S) fire dampers are certified by Building Research Institute (ITB – Instytut Techniki Budowlanej). Certificate of Constancy of Performance No. xxxx-CPR-xxxxx.

The dampers are asymmetrical, designed either for horizontal (in walls) or vertical (in floors) installation.

The dampers are designed, manufactured and tested in accordance with the following standards: PN-EN 15650 "Ventilation for buildings – Fire dampers" and PN-EN 13501-3 "Fire classification of construction products and building elements – Part 3: Classification using data from fire resistance tests on products and elements used in building service installations: fire resisting ducts and fire dampers."

The effectiveness of the dampers is confirmed by tests according to PN-EN 1366-2 "Fire resistance tests for service installations – Part 2: Fire dampers."

The LPP fire damper is classified as tightness class C (housing tightness) on the basis of tests carried out according to PN-EN 1751 "Ventilation for buildings. Air terminal devices. Aerodynamic testing of dampers and valves."

Classification

The LPP-E and LPP-S fire dampers:

EI 120 (v_e h_o i↔o) S
It means the damper fulfils the criteria for fire integrity, fire insulation and smoke leakage for at least 120 minutes.

The LPP fire dampers may be installed in vertical building partitions with either horizontal or vertical rotation axis, with any actuator position.

The dampers may be mounted individually or in sets (16 pcs max., up to 6 m2) in rigid walls.

Description

The damper consists of two housings made of galvanized metal sheet, separated with insulating separators made of 40 mm thick fire-resistant material. The movement of the baffle into the closed position by means of a set of tie rods is limited by a buffer. The axes of the baffle are embedded by slide bearings in the insulating separators. The baffle is closed by means of a set of tie rods.

The dampers can also be manufactured in a special version dedicated to chemically aggressive environments. Such dampers are used in chemical and food industries, in laboratories, etc. All steel parts are made of 1.4301 acid-proof steel, the bearings of the dampers are still made of brass, and the isolating baffle is impregnated (with a solvent-free, silicate-based substance).

The permissible air velocity in a BxH connection duct is 12 m/s for the LPP-E damper with an actuator and 8 m/s for the LPP-S damper with a spring mechanism.

Manufacturing versions

The range of dampers covers the following dimensions: a clear damper width from 200 to 1500 mm (10 mm intervals) and a clear damper height from 200 to 1500 mm (10 mm intervals).

LPP-E – a fire damper for ventilation ducts (normally open), with a spring return actuator.

The LPP-E fire dampers are driven by means of the BFL, BFN or BF electric actuators manufactured by BELIMO (supply voltage 24 V AC/DC or 230 V AC).

After the voltage has been supplied, the actuator rotates the baffle to the open position. The baffle is closed due to voltage loss or when the thermal trigger (BAE or BAT) is activated (the return spring in the actuator closes the baffle by returning to the non-stressed position). On request, the LPP-E dampers can be equipped with a thermal switch with the activation temperature of 95 °C.

The use of the BFL actuators manufactured by BELIMO is limited to a surface area of the dampers up to 0.25 m^2, and the BFN actuators to a surface area below 0.75 m^2.

Fire ventilation zone

EN 15650

SO Ve Ho

There are 2 microswitches embedded in the spring return actuators for the indication of the damper's position. The position of the damper can be read on a mechanical position indicator.

> During normal operation of the system, the DUC-SL-I-E dampers are in the open position. If a fire breaks out, the damper baffle rotates to the closed position.

The range of LPP-E dampers is limited to the area of 1.5 m^2. Above this size the dampers are manufactured as sets (batteries). The damper batteries are delivered disassembled into single dampers and prepared for assembly on site.

LPP-S – a fire damper for ventilation ducts (normally open), with a spring mechanism. The actuation system consists of a spring mechanism combined with a SMAY thermal fuse. When the baffle is opened by means of a key, the return spring made of stainless steel wire is tensioned. Once the specific temperature is exceeded (70 ± 5°C by default), the thermal fuse is destroyed, releasing the hook, and the damper closes.

The current position of the isolating baffle is indicated by the position of the lever relative to the stickers with the "open" and "closed" inscriptions, placed on the damper housing. On request the LPP-S dampers may be equipped with a limit switch that signals the damper closed position. It is also possible to equip the damper with a limit switch that indicates the open position, as well as with both limit switches mentioned above.

> During normal operation of the system, the DUC-SL-I-S dampers are in the open position. If a fire breaks out, the damper baffle rotates to the closed position.

The range of the LPP-S dampers is limited to the size of 1.0 m^2

Special versions

The version of the damper with an actuator system, on request:

- thermoelectric tripping device for closing of the damper at the temperature of 95 ± 5 °C.

The version of the damper dedicated to aggressive environments, on request:

- all steel parts of the LPP dampers are replaced with parts made of 1.4301 acid-proof steel. The bearings of the dampers are made of brass, and the isolating baffle is impregnated with Promat-SR– a solvent-free, silica-based impregnation manufactured by PROMAT.

Dimensions

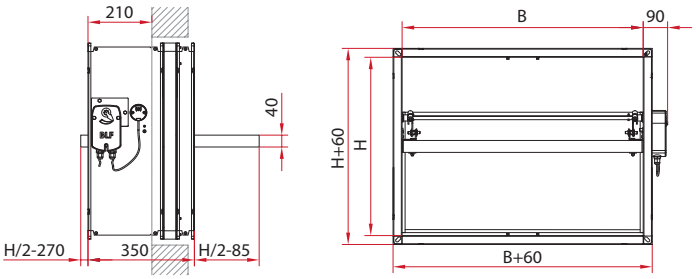


Figure 1. LPP-E damper (with a spring return electric actuator).

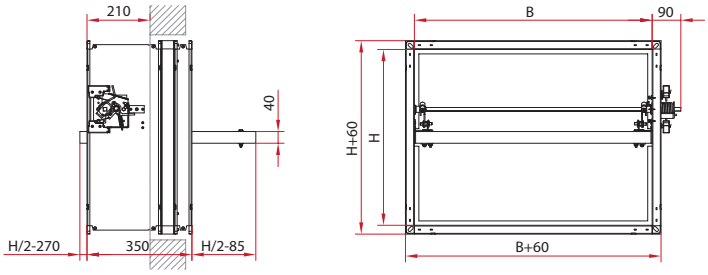
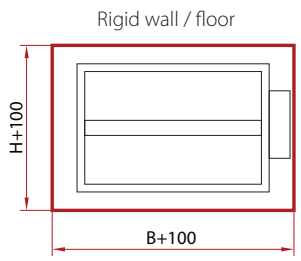
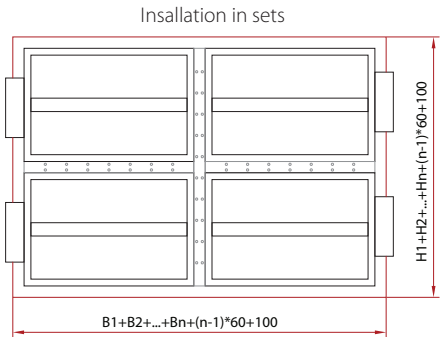
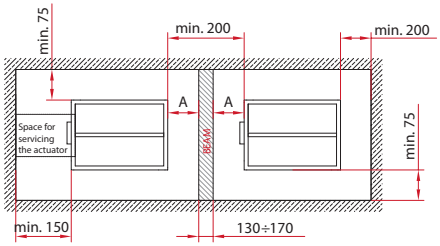


Figure 2. LPP-S damper (with a spring mechanism).

Installation







Permissible range: B + (80 ÷ 120) mm / H + (80 ÷ 120) mm

Figure 3. Openings required for the LPP damper mounted separately.

Figure 4. Openings required for the LPP dampers installed in sets.

Figure 5. Spacing required between dampers installed individually.

Technical data

Table 1. The net surface area and the range of actuators used for the LPP dampers

LPP		Width B [mm]																										
		200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500
Height H [mm]	200	0,027	0,035	0,042	0,049	0,056	0,064	0,071	0,078	0,085	0,093	0,100	0,107	0,114*	0,122*	-	-	-	-	-	-	-	-	-	-	-	-	-
	250	0,037	0,046	0,056	0,066	0,076	0,085	0,095	0,105	0,115	0,124	0,134	0,144	0,154	0,163	0,173	0,183*	0,193*	0,202*	-	-	-	-	-	-	-	-	-
	300	0,046	0,058	0,070	0,083	0,095	0,107	0,119	0,132	0,144	0,156	0,168	0,181	0,193	0,205	0,217	0,230	0,242	0,254	0,266	0,279*	0,291*	0,303*	-	-	-	-	-
	350	0,055	0,070	0,085	0,099	0,114	0,129	0,144	0,158	0,173	0,188	0,203	0,217	0,232	0,247	0,262	0,276	0,291	0,306	0,321	0,335	0,350	0,365	0,380	0,394*	0,409*	0,424*	-
	400	0,064	0,082	0,099	0,116	0,133	0,151	0,168	0,185	0,202	0,220	0,237	0,254	0,271	0,289	0,306	0,323	0,340	0,358	0,375	0,392	0,409	0,427	0,444	0,461	0,478	0,496	0,513
	450	0,074	0,093	0,113	0,133	0,153	0,172	0,192	0,212	0,232	0,251	0,271	0,291	0,311	0,330	0,350	0,370	0,390	0,409	0,429	0,449	0,469	0,488	0,508	0,528	0,548	0,567	0,587
	500	0,083	0,105	0,127	0,150	0,172	0,194	0,216	0,239	0,261	0,283	0,305	0,328	0,350	0,372	0,394	0,417	0,439	0,461	0,483	0,506	0,528	0,550	0,572	0,595	0,617	0,639	0,661
	550	0,092*	0,117	0,142	0,166	0,191	0,216	0,241	0,265	0,290	0,315	0,340	0,364	0,389	0,414	0,439	0,463	0,488	0,513	0,538	0,562	0,587	0,612	0,637	0,661	0,686	0,711	0,736
	600	0,101*	0,129	0,156	0,183	0,210	0,238	0,265	0,292	0,319	0,347	0,374	0,401	0,428	0,456	0,483	0,510	0,537	0,565	0,592	0,619	0,646	0,674	0,701	0,728	0,755	0,783	0,810
	650	-	0,140*	0,170	0,200	0,230	0,259	0,289	0,319	0,349	0,378	0,408	0,438	0,468	0,497	0,527	0,557	0,587	0,616	0,646	0,676	0,706	0,735	0,765	0,795	0,825	0,854	0,884
	700	-	0,152*	0,184	0,217	0,249	0,281	0,313	0,346	0,378	0,410	0,442	0,475	0,507	0,539	0,571	0,604	0,636	0,668	0,700	0,733	0,765	0,797	0,829	0,862	0,894	0,926*	0,958*
	750	-	0,164*	0,199	0,233	0,268	0,303	0,338	0,372	0,407	0,442	0,477	0,511	0,546	0,581	0,616	0,650	0,685	0,720	0,755	0,789	0,824	0,859	0,894	0,928*	0,963*	0,998*	1,033*
	800	-	-	0,213*	0,250	0,287	0,325	0,362	0,399	0,436	0,474	0,511	0,548	0,585	0,623	0,660	0,697	0,734	0,772	0,809	0,846	0,883	0,921	0,958*	0,995*	1,032*	1,070*	1,107*
	850	-	-	0,227*	0,267	0,307	0,346	0,386	0,426	0,466	0,505	0,545	0,585	0,625	0,664	0,704	0,744	0,784	0,823	0,863	0,903	0,943*	0,982*	1,022*	1,062*	1,102*	1,141*	1,181*
	900	-	-	0,241*	0,284*	0,326	0,368	0,410	0,453	0,495	0,537	0,579	0,622	0,664	0,706	0,748	0,791	0,833	0,875	0,917	0,960*	1,002*	1,044*	1,086*	1,129*	1,171*	1,213*	1,255*
	950	-	-	-	0,300*	0,345	0,390	0,435	0,479	0,524	0,569	0,614	0,658	0,703	0,748	0,793	0,837	0,882	0,927	0,972*	1,016*	1,061*	1,106*	1,151*	1,195*	1,240*	1,285*	1,330*
	1000	-	-	-	0,317*	0,364	0,412	0,459	0,506	0,553	0,601	0,648	0,695	0,742	0,790	0,837	0,884	0,931	0,979*	1,026*	1,073*	1,120*	1,168*	1,215*	1,262*	1,309*	1,357*	1,404*

BFL actuator (BxH≤0,24m²)
BFN actuator (BxH>0,24m²)
BF actuator (BxH>0,75m²)

Table 2. Pressure drop on LPP damper, Δp [Pa]

LPP		v [m/s]	Width B [mm]													
			200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
Height H [mm]	200	4	12	12	10	10	10	10	8	-	-	-	-	-	-	-
		6	25	25	22	22	22	22	20	-	-	-	-	-	-	-
		8	45	46	40	40	40	40	38	-	-	-	-	-	-	-
		10	68	68	60	60	60	60	56	-	-	-	-	-	-	-
	300	4	8	8	7	7	7	6	6	6	6	5	5	-	-	-
		6	18	18	15	15	15	13	13	13	13	11	11	-	-	-
		8	32	32	27	27	27	24	24	24	24	22	22	-	-	-
		10	48	48	41	41	41	35	35	35	35	30	30	-	-	-
	400	4	7	7	6	6	6	5	5	5	5	5	5	5	5	4
		6	15	15	13	13	13	11	11	11	11	11	11	11	11	9
		8	27	27	24	24	24	20	20	20	20	20	20	20	20	17
		10	41	41	35	35	35	30	30	30	30	30	30	30	30	26
	500	4	7	7	6	5	5	5	5	4	4	4	4	4	4	4
		6	14	13	13	11	11	11	11	9	9	9	9	9	9	9
		8	25	24	24	20	20	20	20	16	16	16	16	18	18	18
		10	38	35	35	30	30	30	30	24	24	24	24	24	24	24

LPP		v [m/s]	Width B [mm]													
			200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
Height H [mm]	600	4	7	6	5	5	4	4	4	4	3	3	3	3	4	4
		6	14	13	11	11	9	9	9	9	7	7	7	7	9	9
		8	26	24	20	20	16	16	16	16	12	12	12	14	18	18
		10	40	35	30	30	24	24	24	24	18	18	18	18	24	24
	700	4	-	5	5	4	4	4	3	3	3	3	3	3	3	3
		6	-	11	11	9	9	9	7	7	7	7	7	7	7	7
		8	-	20	20	16	16	16	12	12	12	12	12	14	14	14
		10	-	30	30	24	24	24	18	18	18	18	18	18	18	18
	800	4	-	5	5	4	4	4	3	3	3	3	3	2	3	3
		6	-	11	11	9	9	9	7	7	7	7	7	5	7	7
		8	-	20	20	16	16	16	12	12	12	12	12	10	14	14
		10	-	30	30	24	24	24	18	18	18	18	18	12	18	18
	900	4	-	5	4	4	4	3	3	3	3	3	2	2	2	2
		6	-	11	9	9	9	7	7	7	7	7	5	5	5	5
		8	-	20	16	16	16	12	12	12	12	12	8	10	10	10
		10	-	30	24	24	24	18	18	18	18	18	12	12	12	12
	1000	4	-	-	4	4	3	3	3	3	3	2	2	2	2	2
		6	-	-	9	9	7	7	7	7	7	5	5	5	5	5
		8	-	-	16	16	12	12	12	12	12	8	8	10	10	10
		10	-	-	24	24	18	18	18	18	18	12	12	12	12	12

v [m/s] – air flow velocity in the BxH connection duct

Table 2. Sound power level emitted by the LPP damper to the duct, LWA [dB(A)].

LPP		v [m/s]	Width B [mm]													
			200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
Height H [mm]	200	4	13	16	19	20	21	22	23	-	-	-	-	-	-	-
		6	21	24	27	28	30	30	32	-	-	-	-	-	-	-
		8	30	33	36	37	38	39	41	-	-	-	-	-	-	-
		10	38	41	43	45	46	47	49	-	-	-	-	-	-	-
	300	4	17	20	23	24	26	27	28	29	29	30	31	-	-	-
		6	25	29	31	32	34	35	36	37	37	38	40	-	-	-
		8	34	37	39	41	42	43	44	45	46	47	48	-	-	-
		10	42	45	47	49	50	51	52	53	54	55	57	-	-	-
	400	4	20	23	25	27	28	29	30	31	32	32	33	34	35	35
		6	28	31	33	35	36	38	39	39	40	41	41	42	43	43
		8	36	40	42	43	45	46	47	47	48	49	49	50	51	52
		10	45	48	50	51	53	54	55	55	56	57	57	58	59	59
	500	4	22	25	27	29	30	31	32	33	34	34	35	36	37	38
		6	30	33	35	37	38	39	40	41	42	43	43	44	44	46
		8	37	41	44	45	46	48	48	49	50	51	51	52	51	53
		10	45	49	52	53	54	56	56	57	58	59	59	59	59	61
	600	4	23	26	28	30	31	33	33	34	35	36	36	37	39	39
		6	31	34	37	38	40	41	42	43	44	44	45	45	45	48
		8	40	43	45	47	48	49	50	51	51	52	53	53	53	55
		10	48	51	53	55	56	57	58	59	59	60	61	60	60	63
	700	4	-	28	30	31	33	34	35	36	36	37	38	38	40	40
		6	-	36	38	40	41	42	43	44	45	45	46	46	46	49
		8	-	44	46	48	49	50	51	52	53	53	54	54	54	56
		10	-	52	54	56	57	58	59	60	60	61	62	61	62	64
	800	4	-	29	31	32	34	35	36	37	37	38	39	39	41	41
		6	-	37	39	41	42	43	44	45	46	46	47	47	47	50
		8	-	45	47	49	50	51	52	53	54	54	55	55	55	57
		10	-	53	55	57	58	59	60	61	61	62	63	62	63	65
	900	4	-	29	31	33	34	36	37	37	38	39	40	40	42	42
		6	-	38	40	42	43	44	45	46	47	47	48	48	48	51
		8	-	46	48	50	51	52	53	54	54	55	56	56	56	58
		10	-	54	56	58	59	60	61	62	62	63	64	63	64	66
	1000	4	-	-	33	34	35	36	37	38	39	40	41	41	43	43
		6	-	-	41	42	44	45	46	47	47	48	49	49	49	52
		8	-	-	49	50	52	53	54	54	55	56	57	57	57	60
		10	-	-	57	58	60	61	62	62	63	64	65	65	66	67

v [m/s] – air flow velocity in the BxH connection duct

Table 4. Weight of LPP-E damper, m [kg]

LPP-E		Width B [mm]													
		200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
Height H [mm]	200	11,9	14,2	16,4	18,6	20,8	23,0	25,2	-	-	-	-	-	-	-
	300	14,0	16,6	19,3	21,8	24,4	27,0	29,7	32,6	35,3	38,0	40,7	-	-	-
	400	16,2	19,2	22,2	25,2	28,2	31,5	34,6	37,6	40,7	43,7	46,7	55,1	58,5	61,9
	500	18,3	21,7	25,2	28,6	32,3	35,7	39,2	42,6	46,0	49,4	52,9	62,1	65,8	70,9
	600	20,3	24,2	28,1	32,2	36,0	39,8	43,7	47,5	51,3	55,2	59,0	70,3	74,4	78,6
	700	-	26,7	31,3	35,4	39,7	43,9	48,2	52,4	56,6	62,2	66,4	77,1	81,7	86,2
	800	-	29,2	34,2	38,8	43,4	48,0	52,7	57,3	63,3	68,0	72,6	84,0	89,0	93,9
	900	-	32,0	37,1	42,0	47,1	52,1	57,2	63,6	68,6	73,7	78,7	90,9	96,2	101,6
	1000	-	-	40,0	45,4	50,9	56,3	63,2	68,6	74,1	79,5	84,9	97,8	103,6	109,4

Table 5. Weight of LPP-S damper, m [kg]

LPP-S		Width B [mm]													
		200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
Height H [mm]	200	11,8	14,0	16,2	18,4	20,6	22,8	-	-	-	-	-	-	-	-
	300	13,8	16,5	19,1	21,7	24,3	26,9	29,6	32,0	34,4	36,8	-	-	-	-
	400	16,0	19,0	22,1	25,0	28,0	31,1	34,1	36,9	40,0	43,1	46,2	49,3	52,4	55,5
	500	18,2	21,6	25,0	28,4	31,8	35,2	38,7	42,3	45,7	49,1	52,5	55,9	59,3	62,7
	600	-	23,8	27,7	31,5	35,3	39,5	43,4	47,2	51,1	55,0	58,9	62,8	66,7	70,6
	700	-	26,3	30,6	34,8	39,4	43,6	47,9	52,1	56,4	60,7	65,0	69,3	73,6	-
	800	-	-	33,5	38,1	43,1	47,7	52,4	57,1	61,7	66,3	70,9	-	-	-
	900	-	-	36,4	41,8	46,8	51,8	56,9	62,0	67,0	72,0	-	-	-	-
	1000	-	-	39,4	45,2	50,6	56,0	61,5	67,0	72,4	-	-	-	-	

LPP
RECTANGULAR FIRE DAMPER

When ordering, please provide information according to the following pattern:

LPP–<F> - <B> x <H> - <L> - <W> - <S> - <M> - <Q> - <P>-<RAL>

Where:

F – type of the actuation system used
S – spring mechanism
E – electric spring return actuator

B – damper clear width [mm]

H – damper clear height [mm]

L – damper length in mm, 350 by default (600 mm optionally)

W – limit switches (LPP-L]S dampers only; dampers with actuators are always equipped with limit switches)*
none – no limit switches
W1 – limit switch indicating damper closed position
W2 – limit switch indicating damper open position
W12 – two limit switches indicating closed and open damper positions

S – type of actuator used
BFL – for B x H ≤ 0,24 m^2
BFN – for 0,25 m^2 < BxH ≤ 0,75 m^2
BF – for BxH > 0,75 m^2

Product marking:
24/230 – supply voltage
SR – analogue control
TL – communication control
T – thermoelectric tripping device
ST – connection socket

M – installation in sets*
none – installation in sets not possible
M – damper adapted to installation in sets

Q – inspection opening*
none – no inspection opening
R – inspection opening

P – finishing*
none – galvanized steel
SN – stainless steel
SL – coated steel

RAL – colour as per RAL code (for SL finishing)*

* optional items – if not indicated, default values will be used

Sample product marking:
LPP-O-E-600x400-350-BFL24-T