PS
RECTANGULAR MULTI-BLADE AIRTIGHT DAMPER

Description:
A rectangular multi-blade damper with backward blades and a high level of tightness used for airflow control or closing. Controlled manually or by an electric actuator.

Intended Use

The PS dampers can be mounted in air handling units, in walls or ducts, for precise airflow rate control. Due to their design, they ensure a high level of tightness. The dampers operate very well as shut-off devices. The dampers meet the requirements of **leakage class 2 in accordance with EN-1751**. They can be used in systems that meet special requirements: operation with recuperators (split dampers), protection of the heaters in air handling units against freezing. PS dampers are particularly recommended for air handling units.

Operating temperature: -20 °C to +90 °C (+50 °C in the version
with an actuator).

PS dampers can be made with blades filled with insulating foam. The length of such a blade cannot exceed 800 mm, therefore PS dampers with blades filled with insulation of width A > 800 mm are divided into appropriately smaller coupled kinetic fields separated by means of posts.

The device holds hygiene certificate no. HK/K/0841/02/2017.

Design

PS louvre dampers are made of four types of hardened AL profiles: vertical housings, horizontal housings, blades (louvres) and the shelves for actuators. Damper louvres are connected with bearings and gears made of polypropylene (PP). The drive system is embedded in the profile (vertical housing). The PVC gasket is a seal between the damper blades. The aluminium profile design of the dampers makes it possible to achieve a high precision of the product and installation and therefore they ensure tightness when closed and minimum airflow resistance when open. A built-in drive system makes it possible to completely isolate the damper externally. A special shelf makes the installation of the actuator or the manual mechanism easier. Within the inside diameter of the damper of dimension B ⩾ 1200 mm the blades are connected with a tie rod made of galvanised steel, which protrudes outside the housing.

Manufacturing Versions

Drive:

- **T1** – Damper with an actuator
- **T2** – Damper with a manual mechanism
- **T3** – Damper with an extended axle (for the actuator installation)

Dimensions

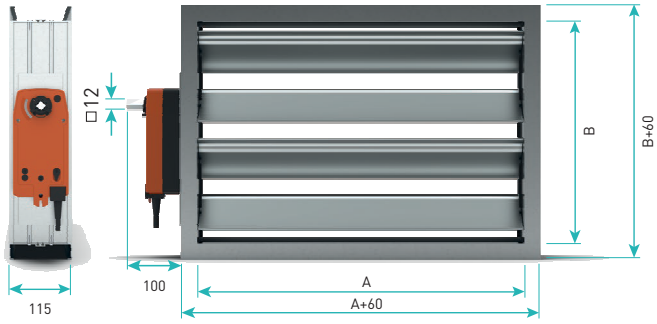


Figure 1. PS damper dimensions.

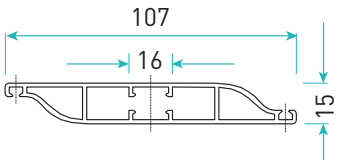


Figure 2. PS damper blade.

Standard dimensions of PS dampers:

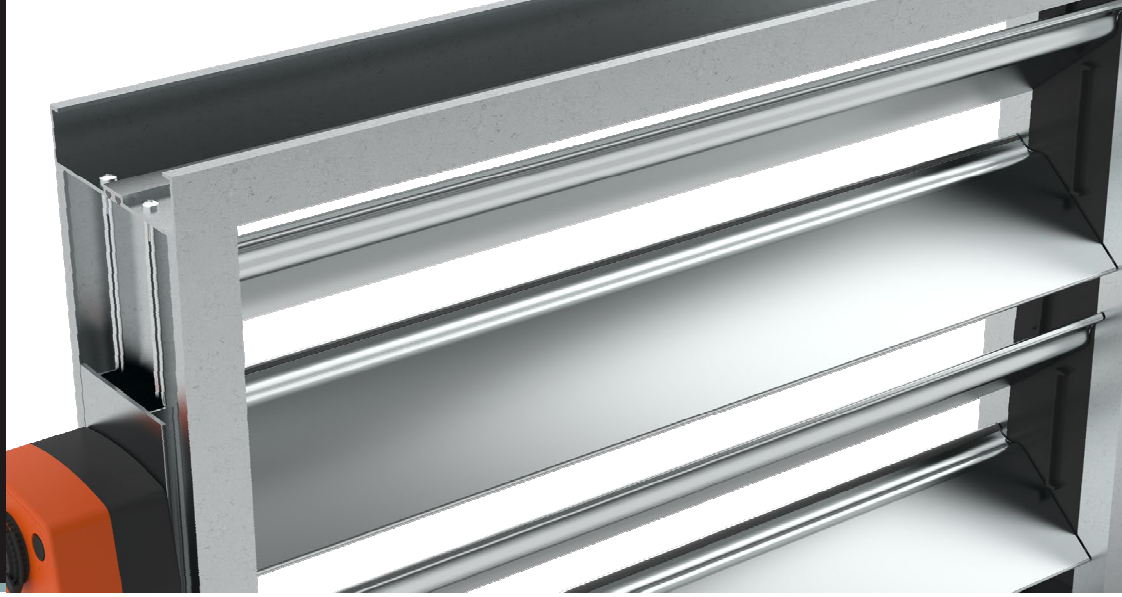
- Width **A = 100 – 3000 mm** (1 mm interval)
- Height **B = 110 – 2510 mm** (100 mm interval)

Due to the depth of the blade, the recommended height is B = n x 100 + 10, where n is the number of the blades. It is possible to make the damper another height (1 mm interval), with a masking frame covering the clearance partially.

The damper of width A > 1400 mm (A > 800 mm for the insulated blades) is divided into modules of maximum width 1400 mm (800 mm). The modules are connected with a common driving axle (single manual mechanism or actuator).

If it is necessary to use a damper larger than 3000 x 2510 mm, a combined damper consisting of two smaller dampers is made. The dampers have independent driving axles (two separate manual mechanisms or actuators on opposite sides).

The aluminium profile shape is protected as a utility design and was registered with the Patent Office of the Republic of Poland.



Technical Data

Table 1. Types of actuators and the net surface area for the PS damper in a fully open position.

Height B, [mm] \ Width A, [mm]	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000
110	0.008	0.017	0.026	0.035	0.044	0.053	0.062	0.070	0.079	0.088	0.097	0.106	0.115	0.124	0.129	0.138	0.147	0.156	0.165	0.173	0.182	0.191	0.200	0.209	0.218	0.227	0.236	0.245	0.250	0.259
210	0.016	0.033	0.051	0.068	0.086	0.103	0.120	0.138	0.155	0.173	0.190	0.207	0.225	0.242	0.252	0.269	0.287	0.304	0.322	0.339	0.356	0.374	0.391	0.409	0.426	0.443	0.461	0.478	0.488	0.505
310	0.024	0.050	0.075	0.101	0.127	0.153	0.179	0.205	0.231	0.257	0.283	0.309	0.334	0.360	0.375	0.401	0.427	0.453	0.479	0.505	0.530	0.556	0.582	0.608	0.634	0.660	0.686	0.712	0.726	0.752
410	0.031	0.066	0.100	0.135	0.169	0.203	0.238	0.272	0.307	0.341	0.375	0.410	0.444	0.479	0.498	0.532	0.567	0.601	0.636	0.670	0.704	0.739	0.773	0.808	0.842	0.876	0.911	0.945	0.965	0.999
510	0.039	0.082	0.125	0.168	0.211	0.254	0.297	0.340	0.382	0.425	0.468	0.511	0.554	0.597	0.621	0.664	0.707	0.750	0.793	0.836	0.879	0.921	0.964	1.007	1.050	1.093	1.136	1.179	1.203	1.246
610	0.047	0.098	0.150	0.201	0.253	0.304	0.355	0.407	0.458	0.510	0.561	0.612	0.664	0.715	0.744	0.796	0.847	0.898	0.950	1.001	1.053	1.104	1.155	1.207	1.258	1.310	1.361	1.412	1.441	1.493
710	0.055	0.115	0.175	0.234	0.294	0.354	0.414	0.474	0.534	0.594	0.654	0.714	0.774	0.833	0.867	0.927	0.987	1.047	1.107	1.167	1.227	1.287	1.346	1.406	1.466	1.526	1.586	1.646	1.680	1.740
810	0.062	0.131	0.199	0.268	0.336	0.404	0.473	0.541	0.610	0.678	0.746	0.815	0.883	0.952	0.990	1.059	1.127	1.195	1.264	1.332	1.401	1.469	1.537	1.606	1.674	1.743	1.811	1.879	1.918	1.986
910	0.070	0.147	0.224	0.301	0.378	0.455	0.532	0.609	0.685	0.762	0.839	0.916	0.993	1.070	1.113	1.190	1.267	1.344	1.421	1.498	1.575	1.652	1.729	1.805	1.882	1.959	2.036	2.113	2.156	2.233
1010	0.078	0.163	0.249	0.334	0.420	0.505	0.590	0.676	0.761	0.847	0.932	1.017	1.103	1.188	1.236	1.322	1.407	1.493	1.578	1.663	1.749	1.834	1.920	2.005	2.090	2.176	2.261	2.347	2.395	2.480
1110	0.086	0.180	0.274	0.367	0.461	0.555	0.649	0.743	0.837	0.931	1.025	1.119	1.213	1.306	1.359	1.453	1.547	1.641	1.735	1.829	1.923	2.017	2.111	2.204	2.298	2.392	2.486	2.580	2.633	2.727
1210	0.094	0.196	0.298	0.401	0.503	0.606	0.708	0.810	0.913	1.015	1.118	1.220	1.322	1.425	1.482	1.585	1.687	1.790	1.892	1.994	2.097	2.199	2.302	2.404	2.506	2.609	2.711	2.814	2.871	2.974
1310	0.101	0.212	0.323	0.434	0.545	0.656	0.767	0.878	0.989	1.099	1.210	1.321	1.432	1.543	1.605	1.716	1.827	1.938	2.049	2.160	2.271	2.382	2.493	2.604	2.714	2.825	2.936	3.047	3.110	3.221
1410	0.109	0.228	0.348	0.467	0.587	0.706	0.825	0.945	1.064	1.184	1.303	1.422	1.542	1.661	1.729	1.848	1.967	2.087	2.206	2.326	2.445	2.564	2.684	2.803	2.923	3.042	3.161	3.281	3.348	3.467
1510	0.117	0.245	0.373	0.501	0.628	0.756	0.884	1.012	1.140	1.268	1.396	1.524	1.652	1.780	1.852	1.979	2.107	2.235	2.363	2.491	2.619	2.747	2.875	3.003	3.131	3.258	3.386	3.514	3.586	3.714
1610	0.125	0.261	0.397	0.534	0.670	0.807	0.943	1.079	1.216	1.352	1.489	1.625	1.761	1.898	1.975	2.111	2.247	2.384	2.520	2.657	2.793	2.929	3.066	3.202	3.339	3.475	3.611	3.748	3.825	3.961
1710	0.132	0.277	0.422	0.567	0.712	0.857	1.002	1.147	1.292	1.436	1.581	1.726	1.871	2.016	2.098	2.243	2.387	2.532	2.677	2.822	2.967	3.112	3.257	3.402	3.547	3.692	3.836	3.981	4.063	4.208
1810	0.140	0.294	0.447	0.600	0.754	0.907	1.061	1.214	1.367	1.521	1.674	1.828	1.981	2.134	2.221	2.374	2.528	2.681	2.834	2.988	3.141	3.295	3.448	3.601	3.755	3.908	4.062	4.215	4.301	4.455
1910	0.148	0.310	0.472	0.634	0.795	0.957	1.119	1.281	1.443	1.605	1.767	1.929	2.091	2.253	2.344	2.506	2.668	2.829	2.991	3.153	3.315	3.477	3.639	3.801	3.963	4.125	4.287	4.448	4.540	4.702
2010	0.156	0.326	0.496	0.667	0.837	1.008	1.178	1.348	1.519	1.689	1.860	2.030	2.200	2.371	2.467	2.637	2.808	2.978	3.148	3.319	3.489	3.660	3.830	4.000	4.171	4.341	4.512	4.682	4.778	4.948
2110	0.163	0.342	0.521	0.700	0.879	1.058	1.237	1.416	1.595	1.774	1.952	2.131	2.310	2.489	2.590	2.769	2.948	3.127	3.305	3.484	3.663	3.842	4.021	4.200	4.379	4.558	4.737	4.916	5.016	5.195
2210	0.171	0.359	0.546	0.733	0.921	1.108	1.296	1.483	1.670	1.858	2.045	2.233	2.420	2.607	2.713	2.900	3.088	3.275	3.463	3.650	3.837	4.025	4.212	4.400	4.587	4.774	4.962	5.149	5.255	5.442
2310	0.179	0.375	0.571	0.767	0.963	1.158	1.354	1.550	1.746	1.942	2.138	2.334	2.530	2.726	2.836	3.032	3.228	3.424	3.620	3.815	4.011	4.207	4.403	4.599	4.795	4.991	5.187	5.383	5.493	5.689
2410	0.187	0.391	0.595	0.800	1.004	1.209	1.413	1.617	1.822	2.026	2.231	2.435	2.639	2.844	2.959	3.163	3.368	3.572	3.777	3.981	4.185	4.390	4.594	4.799	5.003	5.207	5.412	5.616	5.731	5.936
2510	0.194	0.407	0.620	0.833	1.046	1.259	1.472	1.685	1.898	2.111	2.323	2.536	2.749	2.962	3.082	3.295	3.508	3.721	3.934	4.147	4.359	4.572	4.785	4.998	5.211	5.424	5.637	5.850	5.970	6.183

- Actuator minimum: **4 Nm,** e.g. Belimo LM24A (without a spring) or LF24 (with a spring)
- Actuator minimum: **10 Nm,** e.g. Belimo NM24A (without a spring) or NF24A (with a spring)
- Actuator minimum: **20 Nm,** e.g. Belimo SM24A (without a spring) or SF24A (with a spring)
- Actuator minimum: **40 Nm,** e.g. GM24A (without a spring) or **combined damper 2 x 20 Nm** SF24A (with a spring)
- **Combined damper** consisting of several smaller dampers. **For a custom design – please contact Smay.**

Combined damper 2 x ... Nm requires the use of two smaller dampers with separate actuators.

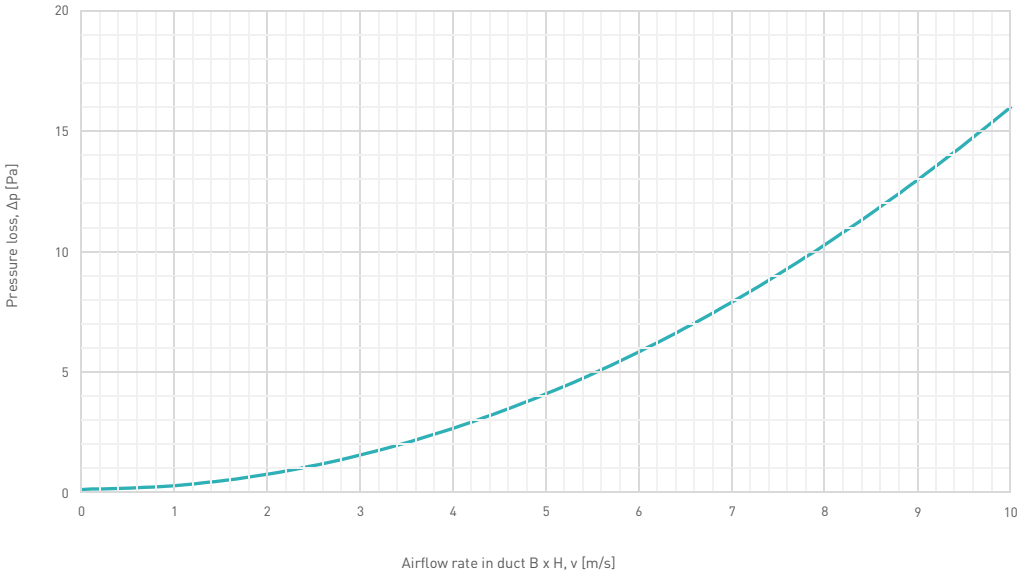


Chart 1. Pressure loss for the standard-height PS damper (in a fully open position).

Pressure loss in a custom-height damper (with a masking frame covering the clearance partially) is comparable to the pressure loss for the nearest smaller standard height damper read from Chart 1.
Δp (600 x 460) ≈ Δp (600 x 410) from Chart 1

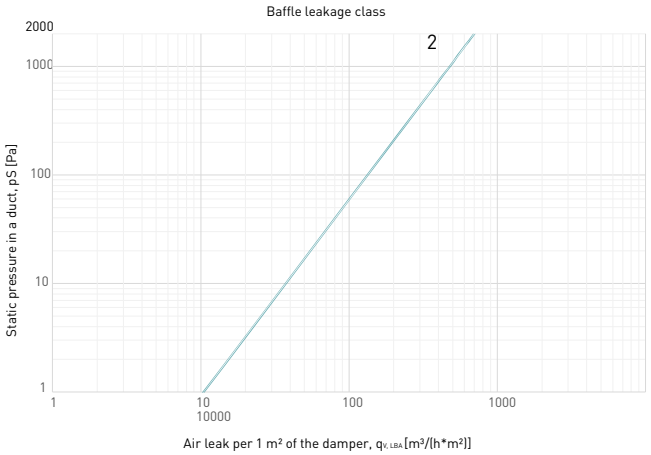


Chart 2. Air leaks through the PS damper baffle (in a fully closed position).

Chart 3. Air leaks through the PS damper housing (in a fully closed position).

Table 2. Approximate weight of PS dampers.

Height B, [mm]	Width A, [mm]																			
	100	200	300	400	500	600	700	800	900	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000
110	1.1	1.3	1.6	1.9	2.1	2.4	2.6	2.9	3.6	3.9	4.5	5.2	5.9	6.8	7.4	8.0	8.7	9.3	9.9	10.8
210	1.5	1.9	2.2	2.6	2.9	3.2	3.6	3.9	4.9	5.3	6.1	7.0	7.8	9.2	10.0	10.8	11.7	12.5	13.3	14.7
310	1.9	2.4	2.8	3.2	3.6	4.1	4.5	4.9	6.1	6.6	7.6	8.7	9.7	11.6	12.6	13.6	14.7	15.7	16.7	18.5
410	2.4	2.9	3.4	3.9	4.4	4.9	5.4	5.9	7.4	8.0	9.3	10.5	11.6	14.0	15.2	16.4	17.7	18.9	20.1	22.4
510	2.8	3.4	4.0	4.6	5.1	5.7	6.3	6.9	8.6	9.3	10.7	12.2	13.6	16.4	17.8	19.2	20.7	22.1	23.5	26.2
610	3.2	3.9	4.6	5.3	5.9	6.6	7.3	8.0	9.9	10.7	12.4	14.0	15.5	18.8	20.4	22.1	23.7	25.3	26.9	30.1
710	3.6	4.4	5.2	5.9	6.7	7.4	8.2	8.9	11.1	12.0	13.9	15.7	17.4	21.2	23.0	24.9	26.7	28.5	30.3	33.9
810	4.1	4.9	5.8	6.6	7.4	8.3	9.1	10.0	12.4	13.4	15.5	17.5	19.3	23.6	25.6	27.7	29.7	31.7	33.8	37.8
910	4.9	5.8	6.7	7.6	8.6	9.5	10.4	11.3	14.0	15.1	17.3	19.6	21.7	26.4	28.6	30.9	33.1	35.3	37.6	42.0
1010	5.4	6.4	7.4	8.4	9.4	10.4	11.4	12.4	15.3	16.6	19.0	21.4	23.7	28.9	31.4	33.8	36.2	38.7	41.1	46.2
1210	7.9	9.1	10.2	11.4	12.6	13.8	14.9	16.1	19.5	20.9	23.8	26.6	29.2	35.4	38.2	41.1	43.9	46.8	49.6	55.5
1410	8.8	10.2	11.5	12.8	14.2	15.5	16.9	18.2	22.1	23.7	27.0	30.2	33.2	40.3	43.5	46.8	50.0	53.3	56.5	63.3
1610	9.8	11.3	12.8	14.3	15.8	17.3	18.8	20.3	24.7	26.5	30.1	33.8	37.1	45.2	48.8	52.5	56.1	59.8	63.4	71.1
1810	10.7	12.4	14.0	15.7	17.4	19.1	20.7	22.4	27.3	29.3	33.3	37.4	41.0	50.1	54.1	58.2	62.2	66.3	70.3	78.9
2010	11.8	13.6	15.5	17.4	19.3	21.2	23.1	25.0	30.4	32.7	37.3	41.8	45.9	56.0	60.6	65.2	69.7	74.3	78.9	88.5
2210	12.7	14.7	16.8	18.9	20.9	23.0	25.0	27.1	33.0	35.5	40.4	45.4	49.8	60.9	65.9	70.9	75.8	80.8	85.8	96.3
2410	13.6	15.9	18.1	20.3	22.5	24.8	27.0	29.2	35.6	38.3	43.6	49.0	53.8	65.8	71.2	76.6	81.9	87.3	92.7	104.1
2510	14.1	16.4	18.7	21.0	23.3	25.6	27.9	30.2	36.8	39.6	45.2	50.7	55.7	68.3	73.8	79.4	85.0	90.5	96.1	107.9

Note: the parameters given in the table apply to the dampers with the blades with no insulation and without an actuator

PS – Rectangular multi-blade airtight damper

When ordering, please provide information as follows:

PS - <I> - <A> x <B> - W<W> - T<N> - <KL>

Where:

I	Damper blade insulation*
	None – Without insulating foam filling
	t – Filled with insulating foam
A	Damper inner clearance width [mm]
B	Damper inner clearance height [mm]
W	Number of damper cross divisions [0 – none]*
N	Drive type*
	1 – With an actuator
	2 – Manual mechanism
	3 – For an actuator
KL	EN 1751 leakage class*
	B2 – Housing: B baffle: 2
	C2 – Housing: C baffle: 2

* Optional values, if not specified, the default values will be used

Sample order: **PSt-400x410-W0-T2-C2**