PWII
RECTANGULAR MULTI-BLADE DAMPER

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

Intended Use

PWII multi-blade dampers with backward blades are designed for airflow control or closing in rectangular ventilation ducts. Operating temperature: -20 °C to +90 °C, (+50 °C for the actuator version).

PWII dampers hold hygiene certificate no. HK/K/0841/03/2017.

Design

The design of PWII-O and PWII-N dampers ensures low air resistance when open and the design of PWII-U also guarantees a good level of tightness when closed. PWII dampers may be adjusted by a manual or automatic (actuator) control system. The housing is made of galvanised or sheet stainless steel. It can be powder coated. All PWII dampers have a raised flange-shaped body (30 mm). Shutters are connected

with bearings and gears made of polypropylene (PP).

PWII-O dampers have housings and shutters (blades) made of galvanised steel profiles. PWII-U dampers have housings made of galvanised sheet steel and shutters (blades) made of aluminium profiles with edge gaskets. There is a tie rod made of galvanised steel on the gear wheels of the dampers measuring B > 1400 mm, which protrudes outside the housing.

PWII-N dampers have housings and shutters made of sheet stainless steel (1.4301).

PWII-U dampers have edge gaskets on blades and can be used to control and shut-off applications, while the others are mainly for control.

Manufacturing Versions

Type:

- **PWII-U** – Shut-off damper (a baffle with a gasket).
- **PWII-O** – Control damper (a baffle without a gasket),
- **PWII-N** – Stainless steel (1.4301) damper

Drive:

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

Dimensions

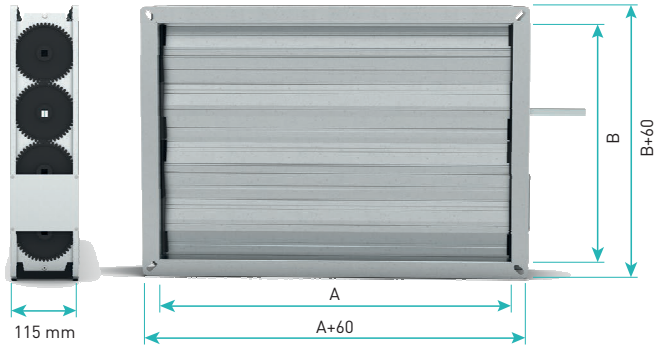

Figure 1. PWII damper dimensions.

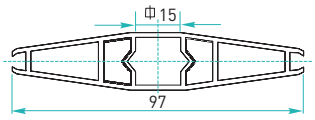

Figure 2. PWII-U damper blade.

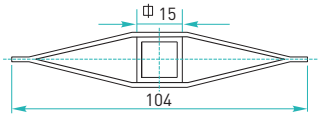

Figure 3. PWII-O and PWII-N damper blade.

Standard dimensions of PWII dampers:

- Width **A = 100 – 2500 mm** (1 mm interval)
- Height **B = 105 – 2005 mm** (100 mm interval)

Due to the width of the blade, the recommended height is B = n x 100 + 5, 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 is divided into modules of maximum width 1400 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 2500 x 2005 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).

There is a tie rod made of galvanised steel on the gear wheels of the dampers measuring B > 1400 mm, which protrudes outside the housing.
Above this value it is recommended that PWWp dampers are used.

Types and characteristics of PWII dampers

Table 1. Types and characteristics of PWII-x dampers.

	PWII-x		
	PWII-0	**PWII-U**	**PWII-N**
Housing	Galvanised sheet steel		Sheet stainless steel
Baffles	Blade made of galvanised sheet metal	Aluminium blade with an edge gasket	Stainless steel blade
Fittings	Flange-shaped body		
Mechanism	Gear wheels on the outside		
	PP bearing pads		

Table 2. Types of actuators and the net surface area for dampers 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
105	0.008	0.017	0.026	0.034	0.043	0.052	0.060	0.069	0.078	0.087	0.095	0.104	0.113	0.121	0.127	0.136	0.145	0.153	0.162	0.171	0.180	0.188	0.197	0.206	0.214
205	0.016	0.033	0.050	0.067	0.084	0.101	0.117	0.134	0.151	0.168	0.185	0.202	0.219	0.236	0.247	0.264	0.281	0.298	0.315	0.332	0.349	0.366	0.383	0.400	0.416
305	0.024	0.049	0.074	0.099	0.124	0.149	0.174	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.367	0.393	0.418	0.443	0.468	0.493	0.518	0.543	0.568	0.593	0.618
405	0.032	0.065	0.098	0.132	0.165	0.198	0.231	0.265	0.298	0.331	0.365	0.398	0.431	0.465	0.488	0.521	0.554	0.587	0.621	0.654	0.687	0.721	0.754	0.787	0.821
505	0.039	0.081	0.122	0.164	0.205	0.247	0.288	0.330	0.371	0.413	0.454	0.496	0.537	0.579	0.608	0.649	0.691	0.732	0.774	0.815	0.857	0.898	0.940	0.981	1.023
605	0.047	0.097	0.147	0.196	0.246	0.296	0.345	0.395	0.445	0.495	0.544	0.594	0.644	0.693	0.728	0.777	0.827	0.877	0.926	0.976	1.026	1.076	1.125	1.175	1.225
705	0.055	0.113	0.171	0.229	0.287	0.345	0.402	0.460	0.518	0.576	0.634	0.692	0.750	0.808	0.848	0.906	0.964	1.021	1.079	1.137	1.195	1.253	1.311	1.369	1.427
805	0.063	0.129	0.195	0.261	0.327	0.393	0.459	0.526	0.592	0.658	0.724	0.790	0.856	0.922	0.968	1.034	1.100	1.166	1.232	1.298	1.364	1.430	1.497	1.563	1.629
905	0.071	0.145	0.219	0.294	0.368	0.442	0.516	0.591	0.665	0.739	0.814	0.888	0.962	1.037	1.088	1.162	1.236	1.311	1.385	1.459	1.534	1.608	1.682	1.757	1.831
1005	0.078	0.161	0.243	0.326	0.408	0.491	0.573	0.656	0.738	0.821	0.903	0.986	1.068	1.151	1.208	1.290	1.373	1.455	1.538	1.620	1.703	1.785	1.868	1.950	2.033
1105	0.086	0.177	0.268	0.358	0.449	0.540	0.630	0.721	0.812	0.903	0.993	1.084	1.175	1.265	1.328	1.419	1.509	1.600	1.691	1.781	1.872	1.963	2.054	2.144	2.235
1205	0.094	0.193	0.292	0.391	0.490	0.589	0.687	0.786	0.885	0.984	1.083	1.182	1.281	1.380	1.448	1.547	1.646	1.745	1.844	1.943	2.041	2.140	2.239	2.338	2.437
1305	0.102	0.209	0.316	0.423	0.530	0.637	0.744	0.852	0.959	1.066	1.173	1.280	1.387	1.494	1.568	1.675	1.782	1.889	1.996	2.104	2.211	2.318	2.425	2.532	2.639
1405	0.110	0.225	0.340	0.456	0.571	0.686	0.801	0.917	1.032	1.147	1.263	1.378	1.493	1.609	1.688	1.803	1.919	2.034	2.149	2.265	2.380	2.495	2.611	2.726	2.841
1505	0.117	0.241	0.364	0.488	0.611	0.735	0.858	0.982	1.105	1.229	1.352	1.476	1.599	1.723	1.808	1.932	2.055	2.179	2.302	2.426	2.549	2.673	2.796	2.920	3.043
1605	0.125	0.257	0.389	0.520	0.652	0.784	0.915	1.047	1.179	1.311	1.442	1.574	1.706	1.837	1.928	2.060	2.192	2.323	2.455	2.587	2.718	2.850	2.982	3.114	3.245
1705	0.133	0.273	0.413	0.553	0.693	0.833	0.972	1.112	1.252	1.392	1.532	1.672	1.812	1.952	2.048	2.188	2.328	2.468	2.608	2.748	2.888	3.028	3.168	3.307	3.447
1805	0.141	0.289	0.437	0.585	0.733	0.881	1.029	1.178	1.326	1.474	1.622	1.770	1.918	2.066	2.168	2.316	2.465	2.613	2.761	2.909	3.057	3.205	3.353	3.501	3.649
1905	0.149	0.305	0.461	0.618	0.774	0.930	1.086	1.243	1.399	1.555	1.712	1.868	2.024	2.181	2.288	2.445	2.601	2.757	2.914	3.070	3.226	3.383	3.539	3.695	3.851
2005	0.156	0.321	0.485	0.650	0.814	0.979	1.143	1.308	1.472	1.637	1.801	1.966	2.130	2.295	2.408	2.573	2.737	2.902	3.066	3.231	3.395	3.560	3.724	3.889	4.053

Note: the parameters given in the table apply to the -U version (blades with seals).

- 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. 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.**

The combined damper 2 x 20 Nm requires the use of two smaller dampers with separate actuators.

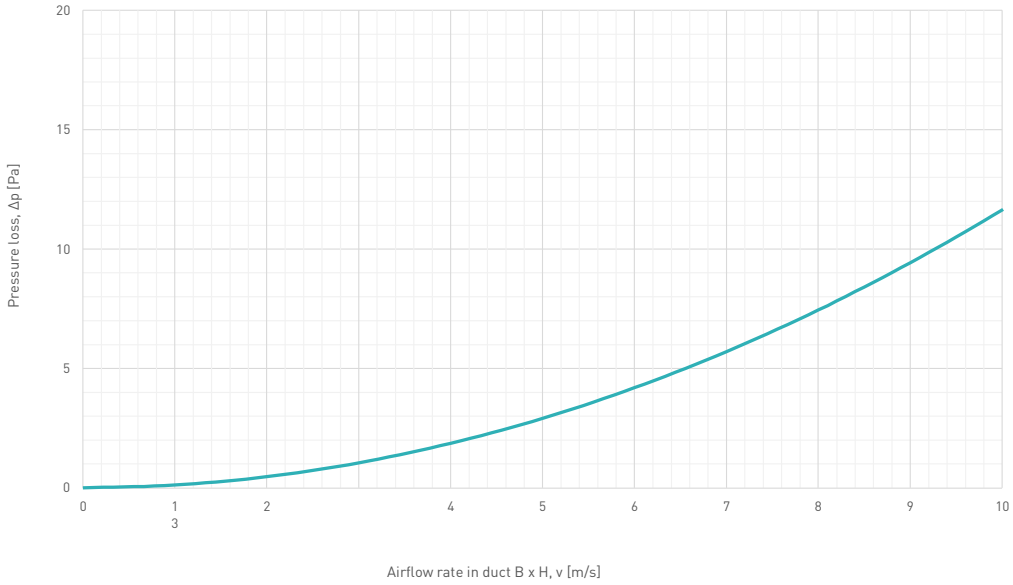

Chart 1. Pressure loss for a standard-height PWII damper (in a fully open position).

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 405) from Chart 1

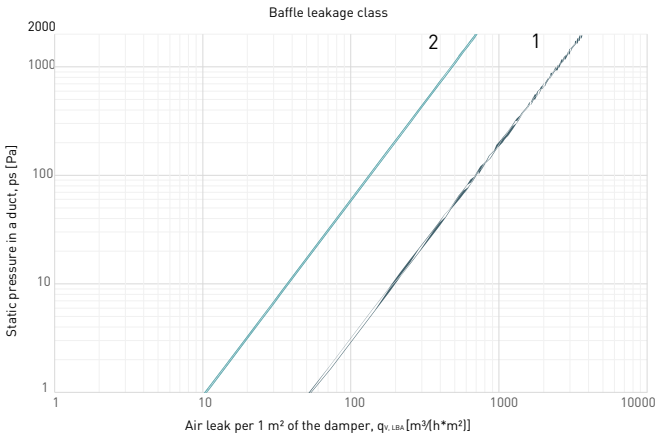

Chart 2. Air leaks through the PWII-U damper baffle (in a fully closed position).

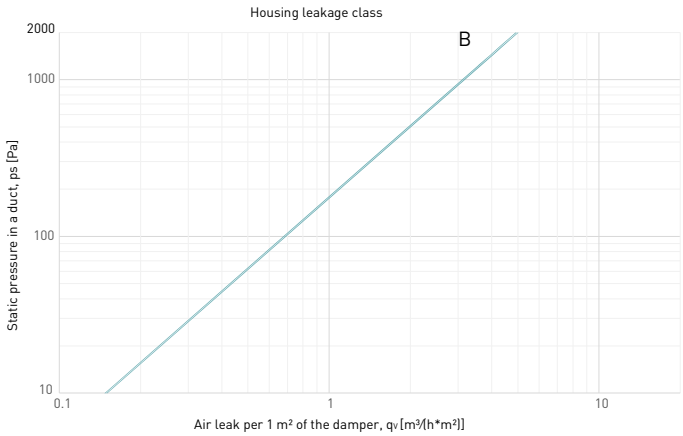

Chart 3. Air leaks through the PWII-U damper housing (in a fully closed position).

Table 3. Approximate weight of PWII dampers.

Height B, [mm]	Width A, [mm]																
	100	200	300	400	500	600	700	800	900	1000	1200	1400	1600	1800	2000	2200	2400
105	1.7	2.2	2.7	3.2	3.6	4.1	4.6	5.1	5.6	6.1	7.0	8.0	9.5	10.4	11.4	12.4	13.3
205	2.2	2.9	3.4	4.0	4.6	5.2	5.8	6.4	6.9	7.5	8.8	9.9	11.9	13.1	14.2	15.3	16.5
305	2.8	3.5	4.2	4.9	5.6	6.3	7.0	7.6	8.3	9.1	10.5	11.8	14.4	15.8	17.1	18.5	19.9
405	3.3	4.1	5.0	5.8	6.6	7.3	8.1	8.9	9.8	10.6	12.2	13.8	16.9	18.5	20.1	21.6	23.2
505	3.9	4.8	5.7	6.6	7.5	8.4	9.3	10.3	11.2	12.1	13.9	15.7	19.4	21.2	23.0	24.8	26.6
605	4.4	5.5	6.5	7.5	8.5	9.5	10.6	11.6	12.6	13.6	15.6	17.6	21.9	23.9	25.9	27.9	29.9
705	5.0	6.1	7.2	8.3	9.4	10.7	11.8	12.9	14.0	15.1	17.3	19.6	24.4	26.6	28.8	31.1	33.3
805	5.5	6.7	7.9	9.2	10.5	11.7	12.9	14.2	15.4	16.6	19.1	21.5	26.9	29.3	31.8	34.2	36.6
905	6.0	7.4	8.7	10.1	11.5	12.8	14.1	15.4	16.8	18.1	20.8	23.4	29.4	32.0	34.7	37.3	40.0
1005	6.6	8.0	9.5	11.0	12.4	13.8	15.3	16.7	18.2	19.6	22.5	25.4	31.9	34.7	37.6	40.5	43.4
1205	7.7	9.4	11.0	12.7	14.3	16.0	17.6	19.3	20.9	22.6	25.9	29.2	36.8	40.2	43.5	46.8	50.1
1405	10.0	11.9	13.8	15.7	17.7	19.6	21.5	23.5	25.4	27.3	31.2	35.0	44.0	47.9	51.8	55.6	59.5
1605	11.1	13.2	15.4	17.5	19.7	21.8	24.0	26.1	28.3	30.4	34.7	39.0	49.1	53.4	57.7	62.0	66.3
1805	12.3	14.6	16.9	19.3	21.7	24.0	26.4	28.8	31.1	33.5	38.2	42.9	54.2	58.9	63.6	68.4	73.1
2005	13.5	15.9	18.5	21.1	23.7	26.2	28.8	31.4	34.0	36.6	41.7	46.9	59.3	64.4	69.6	74.7	79.9

Note: the parameters given in the table apply to the dampers made of sheet steel, version -U (blades with seals) without an actuator.

PWII – Rectangular multi-blade damper

When ordering, please provide information as follows:

PWII - <P> - <A> x <B> - W<W> - T<N> - <KL>

Where:

P	Version*
	U – Aluminium blades with PVC seals, a housing made of galvanised sheet metal
	0 Blades and housing made of galvanised sheet metal
	N Blades and housing made of stainless sheet metal
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*
	BX – Housing: B, baffle: none (a baffle without a gasket)
	B1 – Housing: B, baffle: 1 (a baffle with a gasket, surface area A x B < 0.25 m²)
	B2 – Housing: B, baffle: 2 (a baffle with a gasket, surface area A x B ⩾ 0.25 m²)

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

Sample order: **PWII-0-400x405-W0-T2-BX**