

PWS

RECTANGULAR MULTI-BLADE AIRTIGHT DAMPER



Description:

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

Intended Use

They can be installed in air handling units or in a wall. The design of the damper ensures leakage class **3 - 4 in accordance with EN-1751**. 165 [mm] wide blades of the damper are designed in such a way that a 2000 x 2000 [mm] damper can withstand the pressure of 2500 [Pa]. Special sealing inserts installed at the blade ends ensure high integrity.

Operating temperature: -20 °C to +90 °C, (+50 °C for the actuator version).

Design

The PWS damper housing is made of galvanised sheet steel and the blades are made of aluminium profile. Special inserts with a sleeve seal are installed at the ends of the blades. The blades are mounted in ball bearings embedded in the housing.

The blades of the damper are mounted on a frame, with the rolling bearing covered on both sides, which ensures long fault-free operation. The damper can operate under very hard environmental conditions (dust and humidity). The individual blades are driven by the system of levers and tie rods in either a PWSp backward or PWSw concurrent arrangement. These features make the damper especially recommended for air handling units, the cross-section horizontal dimension of which exceeds 1400 [mm] horizontally and 1000 [mm] vertically.

PWS dampers normally meet leakage class 3 requirements. For special orders, it is possible to make them as leakage class 4 devices.



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

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

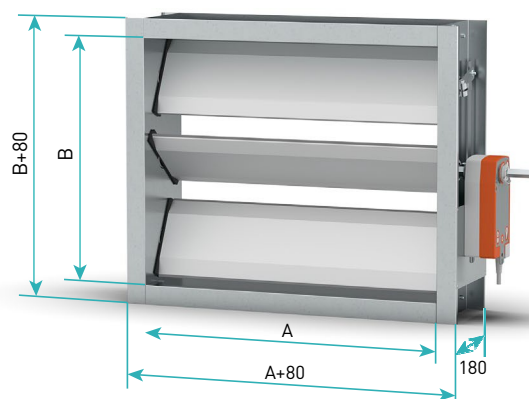


Figure 1. PWS damper dimensions.

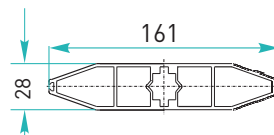


Figure 2. PWS damper blade.

Standard dimensions of PWSp dampers:

- Width **A = 300 – 2000 mm** (1 mm interval)
- Height **B = 210 – 2000 mm** (165 mm interval)

Standard dimensions of PWSw dampers:

- Width **A = 210 – 2000 mm** (1 mm interval)
- Height **B = 170 – 1820 mm** (165 mm interval)

Due to the depth of the blade, the recommended height is $B = n \times 165 + 5$, 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.

A damper with insulated blades, with width $A > 1200$ mm is divided into modules with a maximum width of 1200 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 2000 x 2000 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).



Technical Data

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

Height B, [mm]	Width A, [mm]																	
	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
170	0.041	0.055	0.069	0.082	0.096	0.110	0.123	0.137	0.151	0.164	0.178	0.192	0.206	0.219	0.233	0.247	0.260	0.274
335	0.082	0.110	0.137	0.164	0.192	0.219	0.247	0.274	0.301	0.329	0.356	0.384	0.411	0.438	0.466	0.493	0.521	0.548
500	0.123	0.164	0.206	0.247	0.288	0.329	0.370	0.411	0.452	0.493	0.534	0.575	0.617	0.658	0.699	0.740	0.781	0.822
665	0.164	0.219	0.274	0.329	0.384	0.438	0.493	0.548	0.603	0.658	0.712	0.767	0.822	0.877	0.932	0.986	1.041	1.096
830	0.206	0.274	0.343	0.411	0.480	0.548	0.617	0.685	0.754	0.822	0.891	0.959	1.028	1.096	1.165	1.233	1.302	1.370
995	0.247	0.329	0.411	0.493	0.575	0.658	0.740	0.822	0.904	0.986	1.069	1.151	1.233	1.315	1.397	1.480	1.562	1.644
1160	0.288	0.384	0.480	0.575	0.671	0.767	0.863	0.959	1.055	1.151	1.247	1.343	1.439	1.534	1.630	1.726	1.822	1.918
1325	0.329	0.438	0.548	0.658	0.767	0.877	0.986	1.096	1.206	1.315	1.425	1.534	1.644	1.754	1.863	1.973	2.082	2.192
1490	0.370	0.493	0.617	0.740	0.863	0.986	1.110	1.233	1.356	1.480	1.603	1.726	1.850	1.973	2.096	2.219	2.343	2.466
1655	0.411	0.548	0.685	0.822	0.959	1.096	1.233	1.370	1.507	1.644	1.781	1.918	2.055	2.192	2.329	2.466	2.603	2.740
1820	0.452	0.603	0.754	0.904	1.055	1.206	1.356	1.507	1.658	1.808	1.959	2.110	2.261	2.411	2.562	2.713	2.863	3.014
1985	0.493	0.658	0.822	0.986	1.151	1.315	1.480	1.644	1.808	1.973	2.137	2.302	2.466	2.630	2.795	2.959	3.124	3.288

Note: the parameters given in the table apply to the version with backward blades.

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

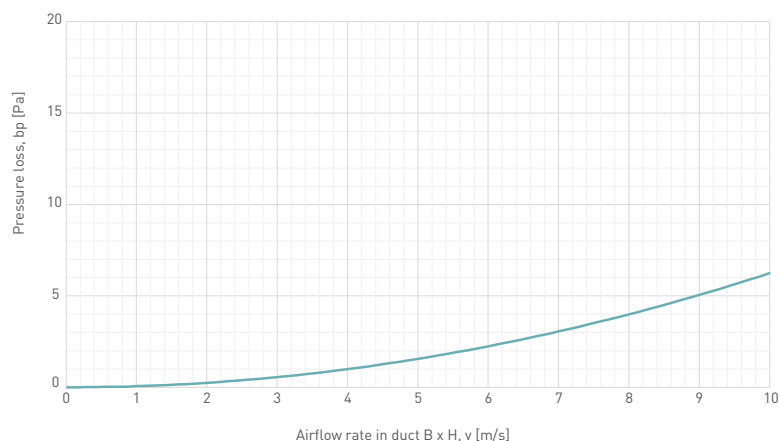


Chart 1. Pressure loss for a standard-height PWS damper (in a fully open position).



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

$\Delta p (600 \times 460) \approx \Delta p (600 \times 335)$
from Chart 1

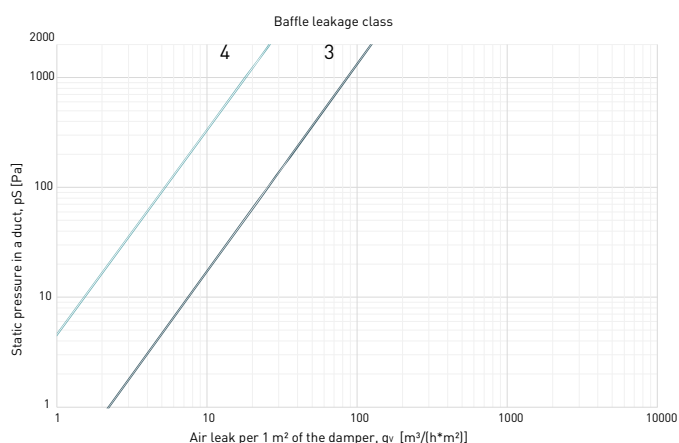


Chart 2. Air leaks through the PWS damper baffle (in a fully closed position).

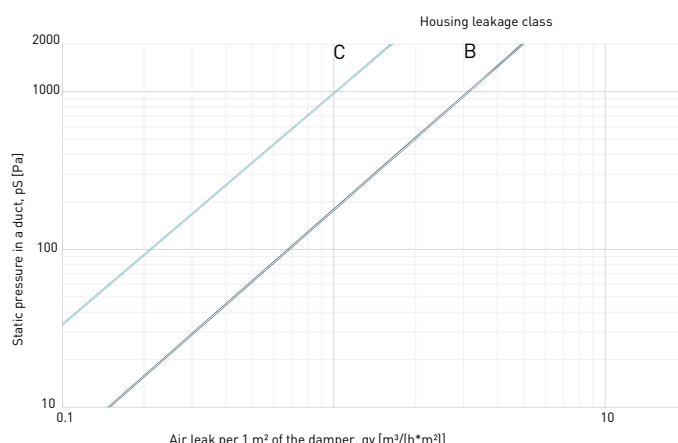


Chart 3. Air leaks through the PWS damper baffle (in a fully closed position).

Table 2. Approximate weight of PWS dampers.

Height B, [mm]	Width A, [mm]												
	300	400	500	600	700	800	900	1000	1200	1400	1600	1800	2000
170	5.6	6.5	7.4	8.4	9.3	10.2	11.1	12.0	13.8	15.6	17.4	19.3	21.1
335	8.2	9.3	10.5	11.7	12.9	14.0	15.2	16.4	18.7	21.1	23.4	25.8	28.1
500	10.7	12.2	13.6	15.0	16.5	17.9	19.3	20.8	23.7	26.5	29.4	32.3	35.1
665	13.6	15.3	17.0	18.7	20.4	22.1	23.8	25.5	28.9	32.3	35.7	39.1	42.5
830	16.1	18.1	20.0	22.0	23.9	25.9	27.9	29.8	33.8	37.7	41.6	45.5	49.5
995	18.6	20.8	23.1	25.3	27.5	29.7	32.0	34.2	38.7	43.1	47.6	52.0	56.5
1160	21.1	23.6	26.1	28.6	31.1	33.6	36.1	38.6	43.5	48.5	53.5	58.5	63.5
1325	24.0	26.8	29.6	32.3	35.1	37.8	40.6	43.3	48.9	54.4	59.9	65.4	70.9
1490	26.8	29.9	33.0	36.0	39.1	42.2	45.3	48.3	54.5	60.6	66.8	73.0	79.1
1655	29.3	32.7	36.0	39.3	42.7	46.0	49.4	52.7	59.4	66.1	72.7	79.4	86.1
1820	31.8	35.4	39.0	42.6	46.2	49.9	53.5	57.1	64.3	71.5	78.7	85.9	93.1
1985	34.3	38.2	42.1	45.9	49.8	53.7	57.6	61.4	69.2	76.9	84.6	92.4	100.1

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

PWS – Rectangular multi-blade airtight damper

When ordering, please provide information as follows:

PWS <K> <I> <C> - <A> x - W<W> - T<N> - <KL>

Where:

K	Kinematics*
	p – Backward blades
	w – Concurrent blades
I	Damper blade insulation*
	None – Without insulating foam filling
	t – Filled with insulating foam
C	Pressure*
	None – Non-pressure systems and systems up to 1000 Pa
	H – From 1000 Pa to 2500 Pa
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*
	B3 – Housing: B baffle: 3
	C4 – Housing: C, baffle: 4 (for A > 830 mm and B ≥ 800 mm only)

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

Sample order: PWSptH-1400x1160-W0-T2-B3