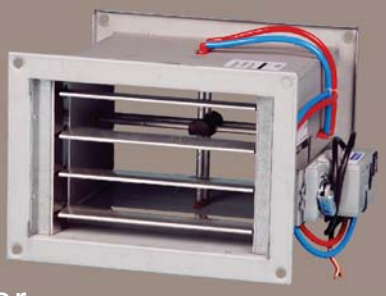
WATERLOO
A Swegon Group Company

AIR VOLUME DAMPERS

Constant Volume Controllers
Volume Flow Rate Controllers
Round Variable Air Volume
Rectangular Variable Air Volume
Variable Air Volume with Sound Attenuator
Secondary Attenuators
Back Pressure Dampers
Control Dampers
Heaters



Reliability

To reliably give your client the service and support they expect, you need confidence that your suppliers will compliment and support your own professionalism. Waterloo's World Class attitudes and beliefs provide this confidence.

World-Class is not a reflection of size or number of employees, it is to do with values such as flexibility, innovation, customer service, integrity, strength of character and good humour. These are the values that separate the outstanding from the ordinary.

Innovation

Some projects are common place, but as the possibilities of building design are pushed to wider and wider boundaries you need to continually search for technically and cost effective solutions to give satisfaction to your client. Waterloo is committed to constant innovation to provide you with those solutions.

We at Waterloo challenge accepted knowledge and use our understanding and learning to sustain our reputation for technical excellence and continually develop one of the widest ranges of air terminal devices in the world. For over 100 years Waterloo have actively pioneered the use of innovative manufacturing techniques, an approach that is still integral to the way we work today.

Quick Delivery

When you are working on fast track projects (or just dealing with unexpected site requirements) you need confidence that your supplier understands and can respond with the required urgency. To give you complete support, Waterloo obsessively maintains high delivery and quality performance.

Waterloo has a well justified reputation throughout the construction industry for very quick service – when others might offer four or six weeks delivery periods, Waterloo prides itself in delivering most small and medium orders in five (yes, five) days.

Flexibility

In an ideal world all projects would commence with the entire design complete and documented. Until then, to give your client maximum confidence and satisfaction, Waterloo's renowned flexibility is at your service.

Unanticipated design issues or site conditions might require complex but timely solutions to exceptional problems. Waterloo's flexibility is founded on our wealth of experience, the fluency and knowledge of our highly-skilled staff and our willingness to explore new ways of working, and our desire to share with you the benefits of our expertise in construction, design, management, planning, procurement and programming.

Specials as Standard

Architectural design is continually developing and the tasks of interpreting the requirements and providing cost effective and practical solutions become more important. Waterloo's complimentary made-to-order programme and fluency with the design and manufacture of bespoke air terminal devices will allow you to realise your vision or solve unanticipated problems on site.

Symbols Used

v	Average air velocity in the duct [m/s]
P_d	Pressure in the duct [Pa]
q_{nom}	The nominal air volume [l/s]. Factory setting
q_{max}	Maximum air volume [l/s]
q_{min}	Minimum air volume [l/s]
q_{const}	Constant air volume [l/s]
L_p	NR Level is peak level on NR curves based on, SWL ref 10^{-12} W less 8dB room absorption [dB]
L_w	Uncorrected sound power level [dB]
q_v	Air volume [l/s]
W	Width [mm]
H	Height [mm]
L	Length [mm]

Contents

AIR VOLUME DAMPERS

Note

Correct duct entry conditions are extremely important for ensuring that a VAV performs as intended. The presented data is for systems where the VAV is mounted a minimum of 2 hydraulic diameters of straight ducting from any device.
Any variation from these inlet conditions will result in a deviation from the calibrated flow range specified at time of order. In such instances the actuators will need to be recalibrated on site. It is the responsibility of the customer to resolve such issues.

Constant Volume Controllers

WRM

Introduction

WRM volume flow rate controllers for air conditioning and ventilation systems, suitable for vertical and horizontal installation in supply and exhaust ducts. The casing and control mechanism are made of galvanised sheet steel. The centrally supported damper blade, which controls the volume flow rate, has a stainless steel bearing axis in special bushings. Adjustment device with rotary pointer, scale and lock for the volume flow rate set point and can be adjusted manually or by actuator.

WRM volume flow controllers are mechanical controllers for constant volume flow rates and do not require an auxiliary power supply. A special control mechanism guarantees control accuracy over the entire volume flow range. For each model size, the volume flow range is at least 5 times the minimum flow rate. Within this control range, specified at V_{min} and V_{max}, the set point for the required volume flow rate is adjustable.

The volume flow rate is maintained constant at varying pressures within the specified pressure range, with an approximate deviation of between ±5% and ±10% with greater deviations at lower flow rates, especially on the smaller sizes.

Product Description

WRM Volume flow rate controllers are mechanical controllers that provide a constant volume flow rate in ventilation and air conditioning installations.

WRM/M Volume flow rate controller with actuator-driven adjustment of the volume flow rate set point.

WRMD Volume flow rate controller with acoustic insulation for the reduction of external sound radiation.

Features

- Volume flow range: 45 to 5200 m³/h
- Pressure range: 50 to 1000 Pa
- Leak tightness classification: A in accordance with EN 1751
- Internal temperature range: -20 to +70°C, 90°C for a short time only
- Lip seals on both connection ends

Options

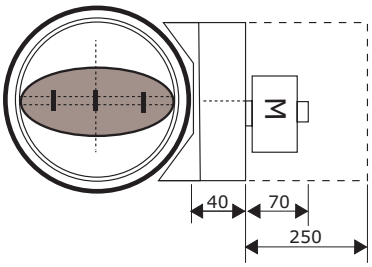
- Actuator AC 230V or AC/DC 24V, setting to two volume flow set points
- Continuous actuator AC/DC 24V, setting to any desired volume flow set point
- External acoustic insulation with sheet metal jacket

Accessories (Transformer)

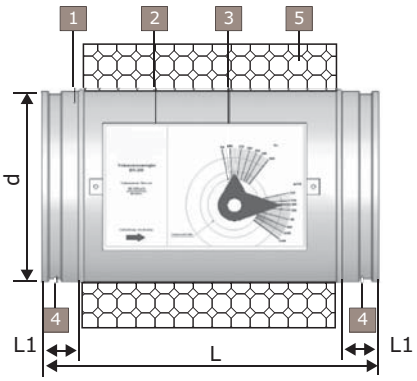
WT24.240 240v to 24v AC Power supply

WRM

WRMD



Advised space requirements for access



1- Round casing
2- Adjustment device
3- Pointer with scale
4- Lip seal
5- Optional acoustic insulation with steel casing

Order Example

WRM/200/M1/D

Type
Size
Actuator
Acoustic Insulation

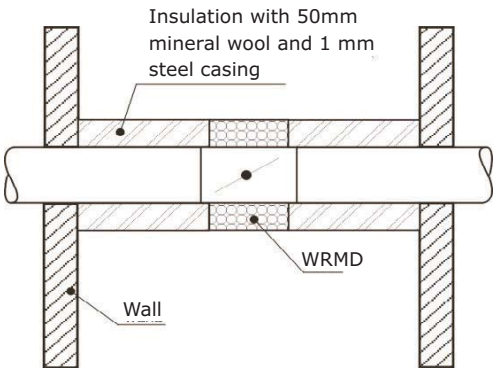
Constant Volume Controllers

WRM

Size DN	V_{min} [m³/h]	V_{max} [m³/h]	V_{min} [l/s]	V_{max} [l/s]	Ød [mm]	L [mm]	L1 [mm]
80	45	210	12.5	60	78	320	38
100	70	325	20	90	98	320	38
125	110	510	30	145	123	320	38
160	180	825	50	230	158	320	38
200	285	1300	80	360	198	350	38
250	450	2030	125	565	248	410	47
315	700	3325	195	925	313	460	47
400	1130	5200	310	1450	398	460	60

Technical data for actuators			
	M1 (LM 230 A)	M2 (LM 24A)	M3 (LM 24A-MF)
Connection voltage	AC 230 V	AC/DC 24 V	AC/DC 24 V
Operating range	85 to 265 V	19.2 to 28.8 V	19.2 to 28.8 V
Torque	5 Nm	5 Nm	5 Nm
Run time for 90°	150 s	150 s	150 s
Input power supply	4 VA	2 VA	2 VA
Energy consumption	1.5 W	1W	1W
Degree of protection	IP 54	IP 54	IP 54
Connecting cable 0.75mm²	~1m (3 core)	~1m (3 core)	~1m (4 core)
Ambient temperature	-30 to +50° c	-30 to +50 ° c	-30 to +50° c

Correction factors for radiated noise if fitted with insulation (in dB)						
Size DN	125 Hz	250 Hz	500 Hz	1KHZ	2KHZ	4KHZ
80	37	45	46	47	54	56
100	38	45	46	47	54	57
125	36	42	48	51	60	58
160	28	35	40	44	51	54
200	22	29	37	42	51	53
250	20	26	35	41	50	52
315	18	26	38	42	51	53
400	16	23	33	39	48	50



Constant Volume Regulator

WRM

Size DN	Velocity (m/s)	Volume Flow (m^3/hr)	dP=100 Pa														dP=200 Pa													
			Airborne noise L_w							Radiated noise L_w							Airborne noise L_w							Radiated noise L_w						
			125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	L (dB) A	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	L (dB) A	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	L (dB) A	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	L (dB) A
			dB							dB							dB							dB						
80	3	55	30	25	25	27	30	30	36	-	-	-	-	-	-	<25	36	31	31	33	36	36	42	-	-	-	-	-	-	<25
	4	73	34	30	30	31	34	33	40	-	-	-	-	-	-	<25	39	35	35	36	39	38	45	21	17	17	18	21	20	27
	6	110	42	40	40	40	42	40	48	24	22	22	22	24	22	30	46	44	44	44	46	44	52	29	27	27	27	29	27	35
	10	180	50	50	50	49	50	49	56	34	34	34	33	34	33	40	52	52	52	51	52	51	58	37	37	37	36	37	36	43
	12	218	53	54	54	53	53	52	59	37	38	38	37	37	36	43	56	57	57	56	56	55	62	40	41	41	40	40	39	46
100	3	80	32	27	27	29	32	32	38	-	-	-	-	-	-	<25	39	34	34	36	39	39	45	-	-	-	-	-	-	<25
	4	106	36	32	32	33	36	35	42	-	-	-	-	-	-	<25	42	38	38	39	42	41	48	24	20	20	21	24	23	30
	6	160	42	40	40	40	42	40	48	24	22	22	22	24	22	30	47	45	45	45	47	45	53	30	28	28	28	30	28	36
	8	213	46	45	45	45	46	44	52	30	29	29	29	30	28	36	50	49	49	49	50	48	56	35	34	34	34	35	33	41
	10	266	49	49	49	48	49	48	55	34	34	34	33	34	33	40	52	52	52	51	52	51	58	38	38	38	37	38	37	44
	12	319	51	52	52	51	51	50	57	39	40	40	39	39	38	45	55	56	56	55	55	54	61	41	42	42	41	41	40	47
125	3	126	40	35	35	37	40	40	46	-	-	-	-	-	-	<25	47	42	42	44	47	47	53	28	23	23	25	28	28	34
	4	168	42	38	38	39	42	41	48	25	21	21	22	25	24	31	49	45	45	46	49	48	55	30	26	26	27	30	29	36
	6	252	46	44	44	44	46	44	52	30	28	28	28	30	28	36	52	50	50	50	52	50	58	34	32	32	32	34	32	40
	8	336	49	48	48	48	49	47	55	32	31	31	31	32	30	38	54	53	53	53	54	52	60	37	36	36	36	37	35	43
	10	421	51	51	51	50	51	50	57	34	34	34	33	34	33	40	56	56	56	55	56	55	62	40	40	40	39	40	39	46
	12	505	53	54	54	53	53	52	59	37	38	38	37	37	36	43	57	58	58	57	57	56	63	42	43	43	42	42	41	48
160	3	209	41	36	36	38	41	41	47	28	23	23	25	28	28	34	48	43	43	45	48	48	54	33	28	28	30	33	33	39
	4	279	43	39	39	40	43	42	49	30	26	26	27	30	29	36	50	46	46	47	50	49	56	35	31	31	32	35	34	41
	6	418	46	44	44	44	46	44	52	32	30	30	30	32	30	38	53	51	51	51	53	51	59	38	36	36	36	38	36	44
	8	557	47	46	46	46	47	45	53	34	33	33	33	34	32	40	55	54	54	54	55	53	61	40	39	39	39	40	38	46
	10	697	49	49	49	48	49	48	55	36	36	36	35	36	35	42	57	57	57	56	57	56	63	42	42	42	41	42	41	48
	12	836	51	52	52	51	51	50	57	38	39	39	38	38	37	44	58	59	59	58	58	57	64	43	44	44	43	43	42	49
200	3	328	42	37	37	39	42	42	48	29	24	24	26	29	29	35	49	44	44	46	49	49	55	35	30	30	32	35	35	41
	4	439	44	40	40	41	44	43	50	31	27	27	28	31	30	37	51	47	47	48	51	50	57	37	33	33	34	37	36	43
	6	658	47	45	45	45	47	45	53	34	32	32	32	34	32	40	54	52	52	52	54	52	60	40	38	38	38	40	38	46
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	12	1316	52	53	53	52	52	51	58	38	39	39	38	38	37	44	59	60	60	59	59	58	65	44	45	45	44	44	43	50
250	3	517	43	38	38	40	43	43	49	29	24	24	26	29	29	35	49	44	44	46	49	49	55	36	31	31	33	36	36	42
	4	690	44	40	40	41	44	43	50	31	27	27	28	31	30	37	51	47	47	48	51	50	57	37	33	33	34	37	36	43
	6	1034	49	47	47	47	49	47	55	35	33	33	33	35	33	41	55	53	53	53	55	53	61	41	39	39	39	41	39	47
	8	1379	51	50	50	50	51	49	57	37	36	36	36	37	35	43	57	56	56	56	57	55	63	44	43	43	43	44	42	50
	10	1724	53	53	53	52	53	52	59	40	40	40	39	40	39	46	59	59	59	58	59	58	65	46	46	46	45	46	45	52
	12	2069	54	55	55	54	54	53	60	42	43	43	42	42	41	48	60	61	61	60	60	59	66	47	48	48	47	47	46	53
315	3	825	44	39	39	41	44	44	50	32	27	27	29	32	32	38	50	45	45	47	50	50	56	38	33	33	35	38	38	44
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400	3	1336	45	40	40	42	45	45	51	34	29	29	31	34	34	40	52	47	47	49	52	52	58	40	35	35	37	40	40	46
	4	1782	46	42	42	43	46	45	52	36	32	32	33	36	35	42	54	50	50	51	54	53	60	42	38	38	39	42	41	48
	6	2672	51	49	49	49	51	49	57	39	37	37	37	39	37	45	58	56	56	56	58	56	64	46	44	44	44	46	44	52
	8	3563	53	52	52	52	53	51	59	41	40	40	40	41	39	47	59	58	58	58	59	57	65	49	48	48	48	49	47	55
	10	4454	56	56	56	55	56	55	62	44	44	44	43	44	43	50	61	61	61	60	61	60	67	51	51	51	50	51	50	57
	12	5345	58	59	59	58	58	57	64	47	48	48	47	47	46	53	63	64	64	63	63	62	69	53	54	54	53	53	52	59

Constant Volume Regulator

WRM

Size DN	Velocity (m/s)	Volume Flow (m^3/hr)	dP=400 Pa														dP=800 Pa													
			Airborne noise L_w							Radiated noise L_w							Airborne noise L_w							Radiated noise L_w						
			125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	L (dB) A	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	L (dB) A	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	L (dB) A	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	L (dB) A
			dB							dB							dB							dB						
80	3	55	42	37	37	39	42	42	48	24	19	19	21	24	24	30	48	43	43	45	48	48	54	39	44	44	42	39	39	33
	4	73	45	41	41	42	45	44	51	26	22	22	23	26	25	32	50	46	46	47	50	49	56	31	27	27	28	31	30	37
	6	110	50	48	48	48	50	48	56	33	31	31	31	33	31	39	54	52	52	52	54	52	60	37	35	35	35	37	35	43
	10	180	56	56	56	55	56	55	62	40	40	40	39	40	39	46	59	59	59	58	59	58	65	44	44	44	43	44	43	50
	12	218	58	59	59	58	58	57	64	43	44	44	43	43	42	49	61	62	62	61	61	60	67	47	48	48	47	47	46	53
100	3	80	46	41	41	43	46	46	52	28	23	23	25	28	28	34	52	47	47	49	52	52	58	33	28	28	30	33	33	39
	4	106	49	45	45	46	49	48	55	31	27	27	28	31	30	37	54	50	50	51	54	53	60	37	33	33	34	37	36	43
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	8	213	55	54	54	54	55	53	61	40	39	39	39	40	38	46	60	59	59	59	60	58	66	45	44	44	44	45	43	51
	10	266	57	57	57	56	57	56	63	42	42	42	41	42	41	48	61	61	61	60	61	60	67	47	47	47	46	47	46	53
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	8	557	61	60	60	60	61	59	67	46	45	45	45	46	44	52	67	66	66	66	67	65	73	51	50	50	50	51	49	57
	10	697	62	62	62	61	62	61	68	47	47	47	46	47	46	53	68	68	68	67	68	67	74	52	52	52	51	52	51	58
	12	836	64	65	65	64	64	63	70	48	49	49	48	48	47	54	70	71	71	70	70	69	76	54	55	55	54	54	53	60
200	3	328	56	51	51	53	56	56	62	41	36	36	38	41	41	47	61	56	56	58	61	61	67	46	41	41	43	46	46	52
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250	3	517	56	51	51	53	56	56	62	42	37	37	39	42	42	48	62	57	57	59	62	62	68	48	43	43	45	48	48	54
	4	690	58	54	54	55	58	57	64	43	39	39	40	43	42	49	65	61	61	62	65	64	71	51	47	47	48	51	50	57
	6	1034	61	59	59	59	61	59	67	47	45	45	45	47	45	53	67	65	65	65	67	65	73	54	52	52	52	54	52	60
	8	1379	63	62	62	62	63	61	69	49	48	48	48	49	47	55	69	68	68	68	69	67	75	56	55	55	55	56	54	62
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	12	2069	66	67	67	66	66	65	72	53	54	54	53	53	52	59	71	72	72	71	71	70	77	59	60	60	59	59	58	65
315	3	825	57	52	52	54	57	57	63	41	36	36	38	41	41	47	64	59	59	61	64	64	70	49	44	44	46	49	49	55
	4	1100	59	55	55	56	59	58	65	44	40	40	41	44	43	50	66	62	62	63	66	65	72	52	48	48	49	52	51	58
	6	1651	62	60	60	60	62	60	68	46	44	44	44	46	44	52	68	66	66	66	68	66	74	56	54	54	54	56	54	62
	8	2201	64	63	63	63	64	62	70	50	49	49	49	50	48	56	70	69	69	69	70	68	76	58	57	57	57	58	56	64
	10	2751	65	65	65	64	65	64	71	52	52	52	51	52	51	58	71	71	71	70	71	70	77	60	60	60	59	60	59	66
	12	3301	66	67	67	66	66	65	72	55	55	55	54	55	54	61	72	73	73	72	72	71	78	62	63	63	62	62	61	68
400	3	1336	58	53	53	55	58	58	64	42	37	37	39	42	42	48	65	60	60	62	65	65	71	51	46	46	48	51	51	57
	4	1782	60	56	56	57	60	59	66	45	41	41	42	45	44	51	67	63	63	64	67	66	73	54	50	50	51	54	53	60
	6	2672	64	62	62	62	64	62	70	48	46	46	46	48	46	54	70	68	68	68	70	68	76	58	56	56	56	58	56	64
	8	3563	66	65	65	65	66	64	72	51	50	50	50	51	49	57	72	71	71	71	72	70	78	60	59	59	59	60	58	66
	10	4454	67	67	67	66	67	66	73	54	54	54	53	54	53	60	73	73	73	72	73	72	79	61	61	61	60	61	60	67
	12	5345	68	69	69	68	68	67	74	57	58	58	57	57	56	63	74	75	75	74	74	73	80	63	64	64	63	63	62	69

Note:
Room attenuation has not been included in the presented data

Volume Flow Rate Controllers

WVK2

Introduction

WVK2 volume flow rate controllers for air conditioning and ventilation systems, suitable for vertical and horizontal installation in supply and exhaust ducts. The casing and control mechanism are made of galvanised sheet steel. The centrally supported damper blade, which controls the volume flow rate, has a stainless steel bearing axis in special bushings. Adjustment device with rotary pointer, scale and lock for the volume flow rate set point and can be adjusted manually or by actuator.

WVK2 Volume Flow Rate Controllers are mechanical controllers for constant volume flow rates and do not require an auxiliary power supply. A special control mechanism guarantees control accuracy over the entire volume flow range. Within this control range, specified at V_{min} and V_{max} the set point for the required volume flow rate is adjustable.

The volume flow rate is maintained constant at varying pressures within the specified pressure range, with an approximate deviation of between ±5% and ±15% with greater deviations at lower flow rates, especially on the smaller sizes.

Product Description

WVK2 Volume flow rate controllers are mechanical controllers that provide a constant volume flow rate in ventilation and air conditioning installations.

WVK2/-/M Volume flow rate controller with actuator-driven adjustment of the volume flow rate set point.

WVK2/-/DS Volume flow rate controller with acoustic Insulation for the reduction of external sound radiation.

Features

- Volume flow range: 200 to 7000 m³/h
- Pressure range: 50 to 1000 Pa
- Leak tightness classification: B in accordance with EN 1751
- Internal temperature range: -20 to +70°C, 90°C for a short time only

Options

- Actuator-driven setting to two volume flow rate set points with 230V~ or 24V power supply
- Continuous actuator-driven setting to any desired volume flow set point with 24V power supply
- External acoustic insulation with sheet metal jacket

Accessories (Transformer)

WT24.240 240v to 24v AC Power supply

WVK2

WVK2/-/M

WVK2/-/DS

Sizes

50 - 1000 Pa see table below:

Width W [mm]	Heigh H [mm]	Length L [mm]	Volume flow rate	
			V_{min} m³/h	V_{max} m³/h
200	100	300	200	800
	150	325	250	1200
	200	425	350	1550
300	100	300	250	1200
	150	325	350	1650
	200	350	500	2100
	250	450	600	2800
	300	500	750	3500
400	200	375	700	3300
	250	450	800	3700
	300	500	1000	4250
500	200	375	875	4125
	250	400	1000	4375
	300	500	1200	5200
600	200	350	1125	4750
	250	500	1400	6000
	300	500	1600	7000

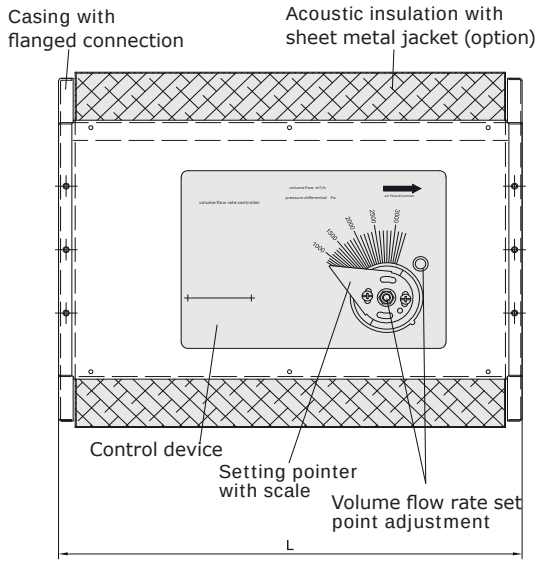
Order Example

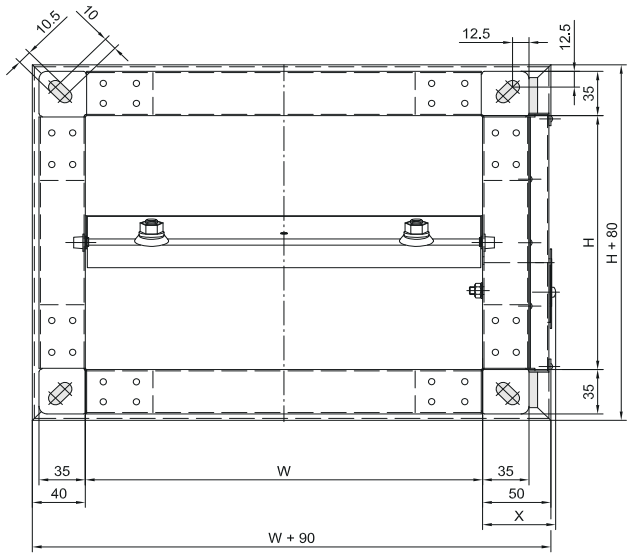
WVK2/200/100/M1/DS

- Type: WVK2
- Width: 200
- Height: 100
- Actuator: M1
- Acoustic Insulation: DS

Volume Flow Rate Controllers

WVK2





Technical data for Actuators			
	M1	M2	M3
Connection voltage	AC 230 v	AC/DC 24 v	AC/DC 24 v
Operating range	85 to 265 v	19.2 to 28.8 v	19.2 to 28.8 v
Torque	5 Nm	5 Nm	5 Nm
Run time for 90°	150 s	150 s	150 s
Input power supply	4 VA	2 VA	2 VA
Energy consumption	1.5 w	1 w	1 w
Degree of protection	IP 54	IP 54	IP 54
Connecting cable 0.75mm²	~1m (3 core)	~1m (3 core)	~1m (4 core)
Ambient temperature	-30 to +50° c	-30 to +50° c	-30 to +50° c

Excess length X at set point adjustment	X [mm]
Manual	55
Actuator-driven	130 maximal

Velocity (m/s)	Airborne Noise L_wA in dBA with Static Pressure			Radiated Noise L_wA in dBA with Static Pressure		
	100 Pa	200 Pa	400 Pa	100 Pa	200 Pa	400 Pa
3	42	49	56	31	38	43
4	44	51	58	34	40	46
6	46	53	61	38	44	50
8	48	56	63	41	47	53
10	50	57	64	43	49	55

Width/Height Correction for Radiated Noise

Height (mm)	Width (mm)				
	200	300	400	500	600
100	-3	-2			
200	-2	-1	0	0	1
300		0	2	2	2

Width/Height Correction for Airborne Noise

Height (mm)	Width (mm)				
	200	300	400	500	600
100	-3	-2			
200	-2	-1	0	1	1
300		0	1	1	2

Spectrum Correction (Add to LwA)

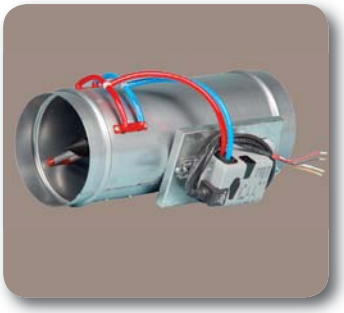
Velocity (m/s)	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
3	0	1	1	-4	-7	-7	-7	-12
4	0	2	1	-3	-7	-8	-9	-14
6	0	4	2	-2	-8	-9	-11	-16
8	0	5	4	-2	-8	-10	-12	-17
10	0	6	5	-2	-9	-11	-13	-18

Notes

Tabulated values inclusive of 8 dB room absorption for sound power Lw ref 10^{-12} w.
When acoustic insulation is used the average room level is 6 dB lower than the tabulated values.

Round Variable Air Volume

WRS / WRD



Introduction

The Waterloo Variable Air Volume damper supplies a controlled volume of air, independent of the duct pressure. The unit consists of a Waterloo Flow Sensor, a damper section and a motor with integrated controller.

The external motor controls the required air volume between factory commissioned maximum and minimum settings. Depending on the chosen controller a BMS control system can be connected to the unit. If required the unit can be set as a constant volume damper. Single skin and double insulated skin units are available.

Product Description

WRS Single skin air volume damper
WRD Double skin insulated air volume damper

Features

- Adjustable for air velocity of 2.0 - 10 m/s
- Accuracy ± 10%
- Suitable for mounting in all positions
- Minimum straight duct is 2x ø diameter of unit
- Manufactured in standard circular duct sizes
- Factory set
- Settings adjustable on site
- Controls from a number of different manufacturers may be fitted.

Finishes

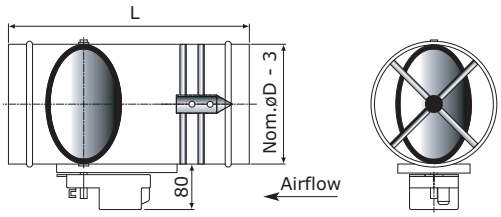
Casing and Damper: Zintec Plate
Damper Blade has a rubber seal

Sizes

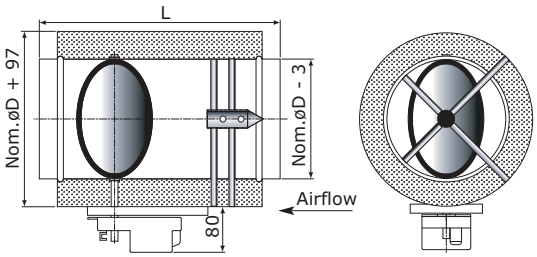
Ø 100, Ø 125, Ø 160, Ø 200,
Ø 250, Ø 315, Ø 355, Ø 400

Accessories (Transformer)

WT24.240 240v to 24v AC Power supply



WRS



WRD

Nom. Ø D	L
100	400
125	400
160	400
200	500
250	500
315	500
355	600
400	600

Order Example

WRD/250
Type
Diameter

Round Variable Air Volume

WRS / WRD

Selection Example

WRS-200

Air Volume (q_v)	658 m³/h or 183 l/s
Operating Pressure (P_d)	400 Pa
Velocity (v)	6 m/s
Pressure Drop (ΔP_d)	19 Pa
Air Noise (L_{PA})	56 dBA
Radiated Noise (L_{PR})	41 dBA

L_p dBA = L_w dBA - 8dB (Room Absorption)

Performance Table

WRS / WRD					Air Noise L_{PA} dBA in dB with Static Pressure				Radiated Noise L_{PR} dBA in dB with Static Pressure							
					WRS / WRD				WRS				WRD			
Nom. Ø D	Air Velocity [m/s]	Air Volume [m³/h]	Air Volume [l/s]	Pressure Drop [Pa]	100 Pa	200 Pa	400 Pa	800 Pa	100 Pa	200 Pa	400 Pa	800 Pa	100 Pa	200 Pa	400 Pa	800 Pa
100	2	53	15	2	35	43	50	55		25	33	37				23
	4	106	29	10	39	45	52	57		27	34	39				26
	6	160	44	23	41	48	54	59	24	29	36	39			24	28
	8	213	59	41	44	50	56	62	26	32	38	43			27	32
	10	266	74	65	47	52	59	64	30	34	41	46		23	29	35
125	2	84	23	2	35	43	50	55		25	33	38				25
	4	168	47	10	40	46	53	58		28	36	41			23	28
	6	252	70	22	43	48	56	61	25	30	38	43			26	31
	8	336	93	39	46	51	58	63	29	33	40	46			29	34
	10	421	117	61	49	54	59	65	31	36	42	48		24	31	36
160	2	139	39	2	33	45	51	57		29	35	41				25
	4	279	78	10	38	48	53	60		31	37	43			22	28
	6	418	116	22	42	52	56	62	25	36	39	46		26	27	33
	8	557	155	39	45	54	58	65	28	38	41	49		23	29	36
	10	697	194	61	49	56	59	67	32	40	43	51		25	31	38
200	2	219	61	2	34	43	49	59		27	34	44				31
	4	439	122	9	39	47	54	61	22	33	38	46			26	33
	6	658	183	19	43	50	56	63	27	35	41	48		23	29	36
	8	877	244	35	46	53	59	66	30	38	43	50		26	31	38
	10	1097	305	54	50	56	61	68	34	40	45	53		28	34	40
250	2	345	96	2	33	42	51	57		26	35	44				31
	4	690	192	9	40	47	54	62	22	32	38	46			26	33
	6	1034	287	18	43	51	57	64	27	35	41	48		23	29	36
	8	1379	383	33	46	54	59	66	30	38	43	50		26	31	38
	10	1724	479	51	50	56	61	68	34	40	45	53		28	34	40
315	2	550	153	2	34	42	51	57		26	36	42			25	32
	4	1100	306	9	41	49	55	61	24	32	39	45		24	30	36
	6	1651	459	17	45	52	59	64	29	36	42	48		27	34	39
	8	2201	611	29	49	55	61	67	33	38	45	50	24	30	36	42
	10	2751	764	46	53	58	63	69	37	41	47	53	27	33	38	44
355	2	712	198	3	33	42	49	58		28	36	45			25	34
	4	1425	396	14	41	50	54	64	26	35	40	48		25	29	37
	6	2137	594	15	44	52	58	65	29	38	44	51	20	27	34	40
	8	2849	791	26	48	55	61	68	33	41	47	54	23	31	36	43
	10	3561	989	41	51	58	64	74	37	44	49	57	27	34	39	46
400	2	891	248	2	34	41	51	60		27	39	46			27	36
	4	1782	495	10	42	49	55	62	27	35	41	48		26	31	39
	6	2672	742	14	45	52	59	65	31	38	44	51	22	28	35	42
	8	3563	990	25	50	55	61	68	35	41	46	54	26	32	37	44
	10	4454	1237	38	53	59	64	72	38	44	50	58	29	35	41	48

Rectangular Variable Air Volume

WLMS / WLMD

Introduction

The Waterloo Variable Air Volume damper supplies a controlled volume of air, independent of the duct pressure. The unit consists of a Waterloo Flow Sensor, a damper section and a motor with an integrated controller.

The external motor controls the required air volume between factory commissioned maximum and minimum settings. Depending on the chosen controller a BMS control system can be connected to the unit. If required the unit can be set as a constant volume damper.

Single skin and double skin insulated units are available.

Product Description

WLMS Single skin air volume damper
WLMD Double skin insulated air volume damper

Features

- Adjustable for air velocity of 2.0 - 10 m/s
- Accuracy ± 10%
- Suitable for mounting in all positions
- Minimum straight duct is 2x longest dimension (W/H) of unit
- Manufactured in standard duct sizes
- Factory set
- Settings adjustable on site
- Controls from a number of different manufacturers may be fitted.

Finishes

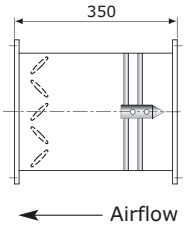
Casing: Zintec Plate
Damper: Aluminium

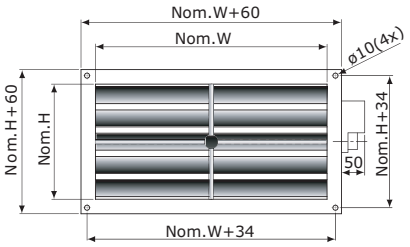
Sizes

Nom. Width 200 - 1000 mm in increments 50 mm
Nom. Height 200 - 600 mm in increments 50 mm

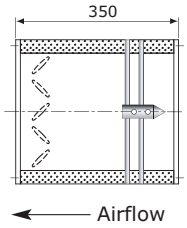
Accessories (Transformer)

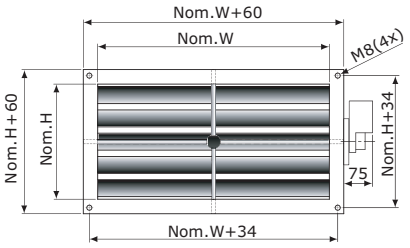
WT24.240 240v to 24v AC Power supply





WLMS





WLMD

Order Example

WLMD/500/300

Type
Nominal Width
Nominal Height

Rectangular Variable Air Volume

WLMS / WLMD

Selection Example

WLMS/500x200

Air Volume (q_v)	2160 m³/h or 600 l/s
Operating Pressure (P_d)	200 Pa
Velocity (v)	q_v / 1000 / (W x H)
	600 / 1000 / (0.5 x 0.2) = 6 m/s
Pressure Drop (ΔP_d)	11 Pa
Air Noise (L_{PA})	dBA 42 - 5 = dBA 37
Radiated Noise (L_{PR})	dBA 46 - 3 = dBA 43

L_p dBA = L_w dBA - 8dB (Room Absorption)

Performance Table

WLMS WLMD		Air Noise L_{PA} dBA in dB with Static Pressure			Radiated Noise L_{PR} dBA in dB with Static Pressure					
		WLMS / WLMD			WLMS			WLMD		
Velocity v	Pressure Drop ΔP_d	100 Pa	200 Pa	400 Pa	100 Pa	200 Pa	400 Pa	100 Pa	200 Pa	400 Pa
2	1	23	30	37	28	35	42	-	22	29
4	5	30	37	43	35	42	48	23	29	35
6	11	40	42	47	40	46	52	32	34	39
8	21	45	47	50	45	49	56	37	40	43
10	35	47	49	60	48	54	59	41	46	49

Width/ height correction for air noise

		Width				
		200	300	600	800	1000
Height	200	-9	-7	-5	-4	-3
	400	-7	-4	-2	-1	0
	600	-5	-2	0	+1	+2

Width/ height correction for radiated noise

		Width				
		200	300	600	800	1000
Height	200	- 5	-4	- 3	-3	-3
	400	-4	-2	-1	-1	0
	600	-3	-2	0	0	+1

Variable Air Volume with Sound Attenuator

WVSV-S / WVSV-E

Introduction

The Waterloo Variable Air Volume damper supplies a controlled volume of air, independent of the duct pressure. The unit consists of a Waterloo Flow Sensor, a damper section and a motor with integrated controller.

The external motor controls the required air volume between factory commissioned maximum and minimum settings. Depending on the chosen controller a BMS control system can be connected to the unit. If required the unit can be set as a constant volume damper.

Product Description

WVSV-S Variable air volume damper with sound attenuation for supply

WVSV-E Variable air volume damper with sound attenuation for extract

Features

- Adjustable for air velocity of 2.0 - 10 m/s
- Accuracy ± 10%
- Applicable in all positions
- Manufactured in standard circular duct sizes
- Factory set
- Settings adjustable on site
- Controls from a number of different manufacturers may be fitted.
- Minimum straight duct for Supply is 2Ø D
- Minimum straight duct for Extract is 2x larger dimension (W/H)

Finishes

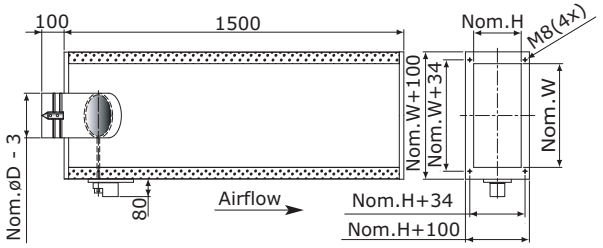
Casing and Damper: Zintec Plate
Damper Blade has a rubber seal
Sound Attenuator is internally lined.

Sizes

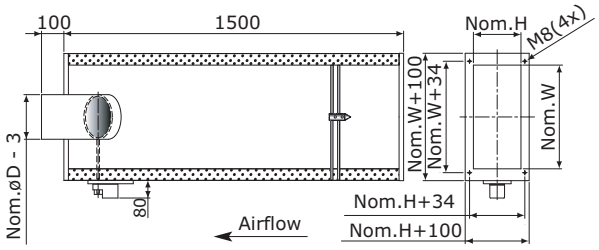
Spigots: Ø100, Ø125, Ø160, Ø200, Ø250, Ø315, Ø355, Ø400
For unit sizes please refer to table

Accessories (Transformer)

WT24.240 240v to 24v AC Power supply

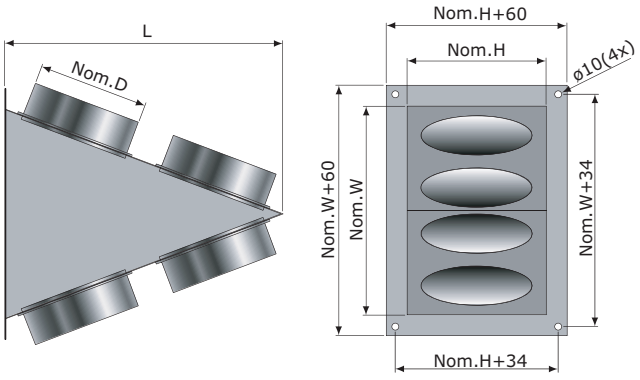


WVSV-S



WVSV-E

Dimensions Table								
Nom. Ø D	100	125	160	200	250	315	355	400
Nom. W	300	300	300	400	400	400	600	600
Nom. H	200	200	200	250	300	350	400	400
L	400	400	400	450	550	700	830	830



Multi discharge box MD

Order Example

WVSV-S/250
Type
Diameter

Variable Air Volume with Sound Attenuator

WVSV-S / WVSV-E

Selection Example

WVSV-S-200

Air Volume (q_v)	658 m³/h or 183 l/s
Operating Pressure (P_d)	400 Pa
Air Velocity (v)	6 m/s
Pressure Drop (ΔP_d)	18 Pa
Air Noise (L_{PA})	dBA 37
Radiated Noise (L_{PR})	dBA 34

Performance Table

WVSV-S / WVSV-E					Air Noise L_{PA} dBA in dB with Static Pressure				Radiated Noise L_{PR} dBA in dB with Static Pressure			
Nom. Ø D	Air Velocity [m/s]	Air Volume [m3/h]	Air Volume [l/s]	Pressure Drop [Pa]	100 Pa	200 Pa	400 Pa	800 Pa	100 Pa	200 Pa	400 Pa	800 Pa
100	2	53	15	2								26
	4	106	29	10				25			24	29
	6	160	44	23		24	27	32		23	29	33
	8	213	59	41		26	33	37		25	32	37
	10	266	74	65	23	29	35	39		28	34	39
125	2	84	23	2				24			26	28
	4	168	47	10		23	25	31			28	33
	6	252	70	22	22	27	29	37		24	31	36
	8	336	93	39	24	29	36	39		30	38	43
	10	421	117	61	26	31	38	42	25	29	36	41
160	2	139	39	2			27	28			27	32
	4	279	78	10			30	32		23	31	36
	6	418	116	21	26	29	35	38		26	33	38
	8	557	155	37	29	32	38	41	23	29	36	41
	10	697	194	57	29	35	39	44	26	32	38	43
200	2	219	61	2			28	34			27	34
	4	439	122	9	25	26	33	39		25	32	39
	6	658	183	18	27	31	37	42		29	34	42
	8	877	244	33	29	35	40	44	24	31	37	44
	10	1097	305	51	31	37	43	48	28	34	39	46
250	2	345	96	2		25	34	41			26	33
	4	690	192	9	26	33	39	45		27	33	39
	6	1034	287	17	30	36	44	49	23	30	37	42
	8	1379	383	29	34	39	46	52	27	33	39	45
	10	1724	479	46	37	43	48	53	30	36	41	47
315	2	550	153	3		27	37	45			26	35
	4	1100	306	4	27	35	42	48		28	32	40
	6	1651	459	15	30	38	46	52	23	30	37	43
	8	2201	611	26	34	42	48	54	26	34	39	46
	10	2751	764	41	37	44	49	57	30	37	42	49
355	2	712	198	2		28	39	47			29	37
	4	1425	396	5	29	37	44	51		28	34	41
	6	2137	594	11	33	39	48	54	25	31	38	44
	8	2849	791	20	37	44	50	56	29	35	41	47
	10	3561	989	30	40	47	52	59	32	38	43	50
400	2	891	248	3	24	29	42	49			32	39
	4	1782	495	8	31	38	46	53		29	36	43
	6	2672	742	19	36	42	50	56	27	32	40	46
	8	3563	990	33	40	46	52	58	31	36	42	48
	10	4454	1237	50	42	49	54	61	34	39	44	51

Secondary Attenuators

WSA

Introduction

The WS series are a range of secondary attenuators to be used in conjunction with the Waterloo range of air volume dampers to provide additional attenuation of duct borne noise in ventilation systems.

Product Description

WS models are available for the whole range of air volume dampers. Refer to tables for model reference and sizes.

Features

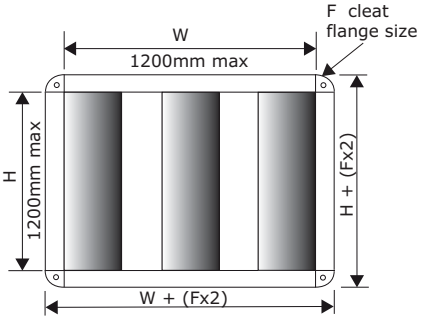
- Rated to ISO 7235 & BS 4718
- Range of lengths
- Robust construction

Materials

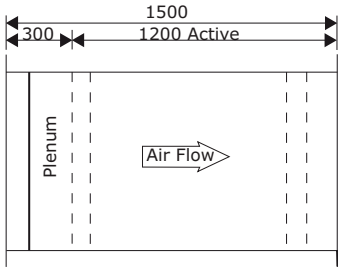
22 SWG Galvanised mild steel casing
26 SWG Galvanised mild steel splitter faces with inert mineral wool infill

Sizes

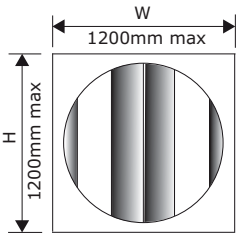
For dimensions see the relevant table.



END VIEW



SIDE VIEW



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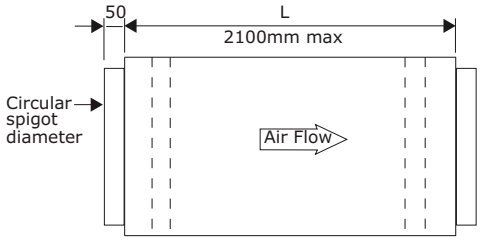
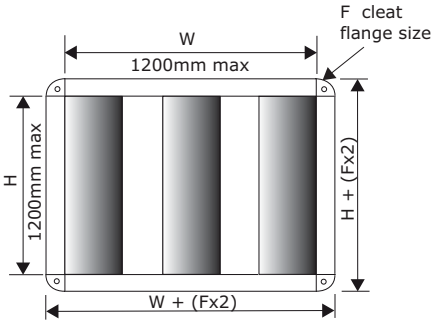


SIDE VIEW



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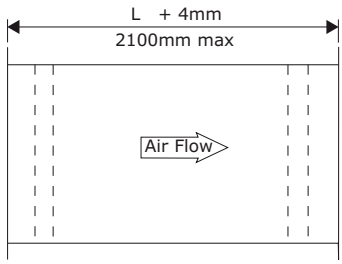


SIDE VIEW

Order Example

WSA/4S/400/250/1200

- Product reference
- Type
- Nominal Width
- Nominal Height
- Nominal Length

Secondary Attenuators

WSA

Secondary attenuators are used to provide additional sound attenuation for systems using volume control devices. The following tables provide dynamic insertion loss selection data for secondary attenuators for each range of variable and constant volume devices offered by Waterloo.

For use with WVR1

SIZE	TYPE	WIDTH	HEIGHT	LENGTH	Dynamic Insertion Loss						l/s	Pa
					125	250	500	1000	2000	4000		
80mm	2S	180	180	600mm	8	12	20	22	23	19	50	8
80mm	4S	180	180	1200mm	14	19	31	39	40	33		
100mm	2S	200	200	600mm	8	12	20	22	23	19	80	14
100mm	4S	200	200	1200mm	14	19	31	39	40	33		
125mm	2S	225	225	600mm	8	12	20	22	23	19	123	21
125mm	4S	225	225	1200mm	14	19	31	39	40	33		
160mm	2S	260	260	600mm	8	12	20	22	23	19	200	31
160mm	4S	260	260	1200mm	14	19	31	39	40	33		
200mm	3MS	300	300	900mm	7	12	19	23	23	18	340	16
200mm	5MS	300	300	1500mm	10	18	30	42	34	23		
250mm	3MS	350	350	900mm	7	12	19	23	23	18	490	17
250mm	5MS	350	350	1500mm	10	18	30	42	34	23		
315mm	3MS	400	400	900mm	7	12	19	23	23	18	780	26
315mm	5MS	400	400	1500mm	10	18	30	42	34	23		

For use with WRS/WRD

SIZE	TYPE	WIDTH	HEIGHT	LENGTH	Dynamic Insertion Loss						l/s	Pa
					125	250	500	1000	2000	4000		
100mm	2S	200	200	600mm	8	12	20	22	23	19	80	14
100mm	4S	200	200	1200mm	14	19	31	39	40	33		
125mm	2S	225	225	600mm	8	12	20	22	23	19	123	21
125mm	4S	225	225	1200mm	14	19	31	39	40	33		
160mm	2S	260	260	600mm	8	12	20	22	23	19	200	31
160mm	4S	260	260	1200mm	14	19	31	39	40	33		
200mm	3MS	300	300	900mm	7	12	19	23	23	18	340	16
200mm	5MS	300	300	1500mm	10	18	30	42	34	23		
250mm	3MS	350	350	900mm	7	12	19	23	23	18	490	17
250mm	5MS	350	350	1500mm	10	18	30	42	34	23		
315mm	3MS	400	400	900mm	7	12	19	23	23	18	780	26
315mm	5MS	400	400	1500mm	10	18	30	42	34	23		
355mm	3MS	450	450	900mm	7	12	19	23	23	18	790	17
355mm	5MS	450	450	1500mm	10	18	30	42	34	23		
400mm	3MS	500	500	900mm	7	12	19	23	23	18	990	14
400mm	5MS	500	500	1500mm	10	18	30	42	34	23		

Secondary Attenuators

WSA

For use with WVK2

WIDTH	HEIGHT	TYPE	Dynamic Insertion Loss						l/s	Pa
			125	250	500	1000	2000	4000		
200	100	5L/SP							160	
200	200								320	
300	100								240	
300	200								480	
300	300								720	
400	100								320	
400	200		6	11	18	26	32	17	640	30
400	300								960	
500	100								400	
500	200								800	
500	300								1200	
600	100								480	
600	200								960	
600	300								1440	

ATTENUATORS
All 1500 long

For use with WLMS/WLMD

WIDTH	HEIGHT	TYPE	Dynamic Insertion Loss						l/s	Pa
			125	250	500	1000	2000	4000		
200	200	5L/SP							320	
400	200								640	
400	400								1280	
600	200								960	
600	400								1920	
600	600								2880	
800	200		6	11	18	26	32	17	1280	30
800	400								2560	
800	600								3840	
1000	200								1600	
1000	400								3200	
1000	600								4800	
1000	900								7200	

ATTENUATORS
All 1500 long

For use with WVSV-S / WVSV-E

SIZE	TYPE	WIDTH	HEIGHT	LENGTH	Dynamic Insertion Loss						l/s	Pa
					125	250	500	1000	2000	4000		
100mm 125mm 160mm	2S	300	200	600mm	5	8	12	20	22	23	155	23
	4S			1200mm	7	14	19	31	39	40		
200mm	2S	400	250	600mm	7	12	19	23	23	18	244	21
	4S	400	250	1200mm	10	18	30	42	34	23		
250mm	2S	400	300	600mm	7	12	19	23	23	18	380	35
	4S	400	300	1200mm	10	18	30	42	34	23		
315mm	3MS	400	350	900mm	7	12	19	23	23	18	610	21
	5MS	400	350	1500mm	10	18	30	42	34	23		
350mm 400mm	3MS	600	400	900mm	7	12	19	23	23	18	990	19
	5MS			1500mm	10	18	30	42	34	23		

Pressure Regulating Dampers

PRDS / PRDE / PRDD

Introduction

The Waterloo PRD Pressure Regulating Dampers are designed to maintain a preset constant pressure differential across a partition wall or within a duct system. The damper incorporates a finely balanced aerofoil blade which is capable of regulating room or duct pressures within a tolerance band of ± 3 Pa over a wide airflow range.

Control pressures are factory set to customer requirements but may be adjusted in service by changing the blade weights. The units are available in three standard widths, with modular heights up to 1275mm, and may be combined with grilles or louvres for through the wall installations.

Typical applications include operating theatres, laboratories, or clean rooms where cascade systems may be used to regulate room pressures. They are also suitable for zone pressurisation systems for smoke control in the event of fire.

Product Description

PRDS Supply pressure regulating damper
PRDE Exhaust pressure regulating damper
PRDD Duct mounted pressure regulating damper

Features

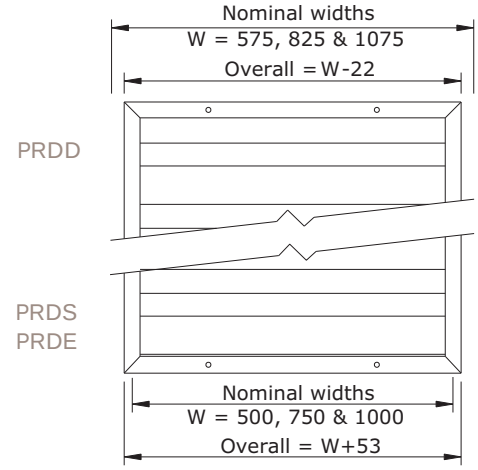
- Passive, balanced blade principle requires no power supply
- Close tolerance control with preset pressures between 15 Pa and 75 Pa
- Wide air handling capacity between 17 l/s and 2900 l/s
- Suitable for supply or exhaust applications
- Easy-clean surfaces suitable for medical applications
- May be integrated with external louvres or internal grilles for through the wall installations

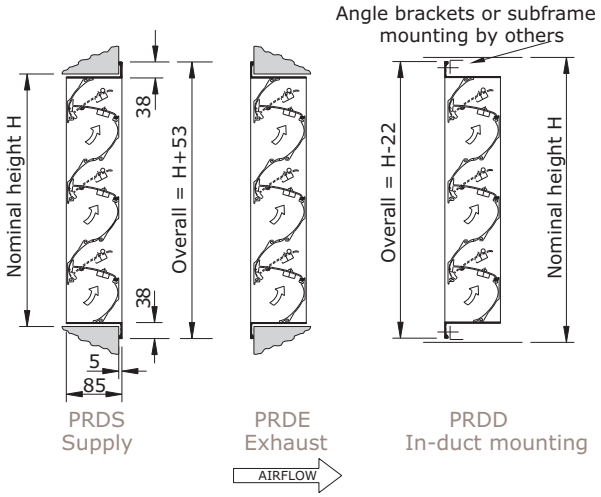
Finishes

PPG9010 (RAL 9010 Gloss - 80% Gloss White)
PPM9010 (RAL 9010 Matt - 20% Gloss White)
PPM9006 (RAL 9006 Matt - 30% Gloss Silver)
Other colours available on request

Manufacture

Waterloo pressure regulating dampers are manufactured from aluminium extrusions and assembled using screw fixing, welding and soldering techniques to form a robust construction. The blade pivot mechanism incorporates nylon bushes and stainless steel pins to ensure maintenance free operation.





No. of Damper Modules	Nominal height 'H'		Approx weight (Kg)		
	PRD (S & E)	PRD(D)	500mm	750mm	1000mm
1	150	225	2.2	3.3	4.4
2	275	350	3.0	4.5	6.0
3	400	475	3.8	5.7	7.6
4	525	600	4.6	6.9	9.2
5	650	725	5.4	8.1	10.8
6	775	850	6.2	9.3	12.4
7	900	975	7.0	10.5	14.0
8	1025	1100	7.7	11.5	15.4
9	1150	1225	8.5	12.7	17.0
10	1275	1350	9.3	14.0	18.6

Order Example

PRDS/750/525/15Pa/PPG9010

Type
Nominal width
Nominal height
Required pressure
Finish

Pressure Regulating Dampers

PRDS / PRDE / PRDD

Performance Criteria

Aerodynamic data presented in tables 1-3 shows the operating flow range for each of the available pressure settings between 15Pa and 75Pa. Damper sizes should ideally be selected to operate over the mid or upper part of the flow range to compensate for potential leakage paths from the controlled zone.

If the damper is to be used in conjunction with a grille or louvre, the maximum flow rate at which control can be maintained will be derated by the factors shown in table 5. The minimum (lift off) flow rate will not be affected. The acoustic data presented in table 4 is indicative of the potential range of dBA levels generated by a 500mm wide damper at each pressure control setting. For critical applications, the upper figure should be assumed.

Selection Example

PRD/1000 wide to maintain a 25Pa room pressure

Air Volume 1000 l/s

From table 3 the minimum damper height would be 900mm, and from table 4, the maximum potential noise level would be

32 + 3 = 35 dBA

Performance Table

PRD Table 1	Air flow range (l/s) for 500mm nominal width													
Nominal height (mm)	ΔP= 15Pa		ΔP= 25Pa		ΔP= 35Pa		ΔP= 45Pa		ΔP= 55Pa		ΔP= 65Pa		ΔP= 75Pa	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
150	17	62	22	80	27	98	30	110	34	124	36	135	40	146
275	21	124	27	160	33	196	37	215	42	245	45	265	50	290
400	26	186	33	235	40	290	45	325	51	367	55	400	60	440
525	30	148	38	315	47	385	52	435	59	490	64	530	70	580
650	34	310	44	390	53	480	60	540	68	610	73	670	80	735
775	38	372	49	470	60	580	67	650	76	735	82	800	90	875
900	43	434	54	550	66	678	75	760	84	860	92	940	100	1020
1025	47	496	60	640	73	778	82	890	93	980	100	1070	110	1160
1150	51	560	65	710	80	875	90	990	102	1130	110	1200	120	1300
1275	55	620	70	800	87	975	97	1100	110	1240	120	1350	130	1460

PRD Table 2	Air flow range (l/s) for 750mm nominal width													
Nominal height (mm)	ΔP= 15Pa		ΔP= 25Pa		ΔP= 35Pa		ΔP= 45Pa		ΔP= 55Pa		ΔP= 65Pa		ΔP= 75Pa	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
150	30	83	38	113	47	144	52	163	59	184	64	201	70	220
275	38	184	49	236	60	288	67	328	76	370	82	404	90	440
400	47	297	60	365	73	434	82	493	93	555	100	606	110	660
525	55	370	70	475	86	580	97	659	110	740	119	808	130	880
650	64	460	82	590	100	720	112	819	127	920	137	1003	150	1090
775	72	550	92	710	112	870	127	988	144	1110	156	1208	170	1310
900	80	640	102	820	125	1000	141	1143	160	1290	174	1407	190	1530
1025	89	740	114	940	139	1140	157	1307	178	1480	193	1613	210	1750
1150	98	830	125	1065	152	1300	172	1478	194	1660	211	1814	230	1970
1275	106	920	135	1180	165	1440	182	1637	210	1840	228	2017	250	2200

PRD Table 3	Air flow range (l/s) for 1000mm nominal width													
Nominal height (mm)	ΔP= 15Pa		ΔP= 25Pa		ΔP= 35Pa		ΔP= 45Pa		ΔP= 55Pa		ΔP= 65Pa		ΔP= 75Pa	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
150	47	124	60	160	73	192	82	220	93	246	100	270	110	290
275	59	246	76	315	93	384	105	435	118	490	130	530	140	580
400	72	372	92	480	112	580	125	660	143	740	155	800	170	870
525	85	496	108	640	132	770	150	880	167	980	180	1050	200	1160
650	97	620	125	800	152	964	170	1100	193	1230	210	1340	230	1450
775	111	742	142	950	173	1150	195	1300	220	1470	240	1600	260	1740
900	124	865	158	1100	192	1350	220	1550	246	1720	265	1850	290	2030
1025	136	990	175	1250	211	1540	240	1750	270	1960	290	2100	320	2320
1150	150	1100	190	1400	237	1730	260	1950	296	2200	320	2400	350	2610
1275	161	1230	205	1600	251	1920	285	2200	321	2450	350	2650	380	2900

Pressure Regulating Dampers

PRDS / PRDE / PRDD

Performance Table

PRD Table 4	Noise rating for a 500mm width (Lp)													
Nominal height (mm)	ΔP= 15Pa		ΔP= 25Pa		ΔP= 35Pa		ΔP= 45Pa		ΔP= 55Pa		ΔP= 65Pa		ΔP= 75Pa	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
150	<20	<20	<20	23	<20	27	21	30	25	33	28	35	31	37
275	<20	21	20	26	20	30	24	33	28	36	31	38	34	40
400	<20	23	22	27	22	32	26	35	30	38	33	40	36	42
525	<20	24	23	29	23	33	27	36	31	39	34	41	37	43
650	<20	25	23	30	24	34	28	37	32	40	35	42	38	44
775	<20	26	23	31	25	35	29	38	33	41	36	43	39	45
900	<20	27	24	32	26	36	30	39	34	42	37	44	40	46
1025	<20	27	24	32	26	36	30	39	34	42	37	44	40	46
1150	20	28	24	33	27	37	31	40	35	43	38	45	41	47
1275	20	28	24	33	27	37	31	40	35	43	38	45	41	47

For a 750mm wide damper add 2dB and for a 1000mm wide damper add 3dB

Table 5	Type of grille over outlet	
	0° blade grilles (e.g. type 3HG)	45 ° blade grilles(e.g. type WG)
Grille 500mm away from PRD	0.7	0.7
Grille 250mm away from PRD	0.64	0.64
Grille directly over PRD outlet	0.7	0.45

Back Pressure Dampers

BPD(S) / BPD(E)

Introduction

The Waterloo Back Pressure Dampers, series BPD, may be used for room-to-room pressure control or as basic non-return valves. Units are suitable for partition, wall, plenum, or duct mounting for projects requiring coarse control of differential pressure. The damper blades modulate automatically with increasing pressure and produce a flat pressure response which is useful for regulation purposes.

Product Description

BPD(S) Supply back pressure damper (duct to room)
BPD(E) Exhaust back pressure damper (room to duct)
SF Screw through flange fixing
No fix No fixing holes or method are supplied

Sizes

Width - 200 to 1400mm
Height - 100 to 1000mm in 75mm increments
Multiple assemblies are available to special detail.

Finishes

PPG9010 (RAL 9010 Gloss - 80% Gloss White)
PPM9010 (RAL 9010 Matt - 20% Gloss White)
PPM9006 (RAL 9006 Matt - 30% Gloss Silver)
Other colours available on request

Installation

Standard fixing is screw through flange (SF).

Accessories

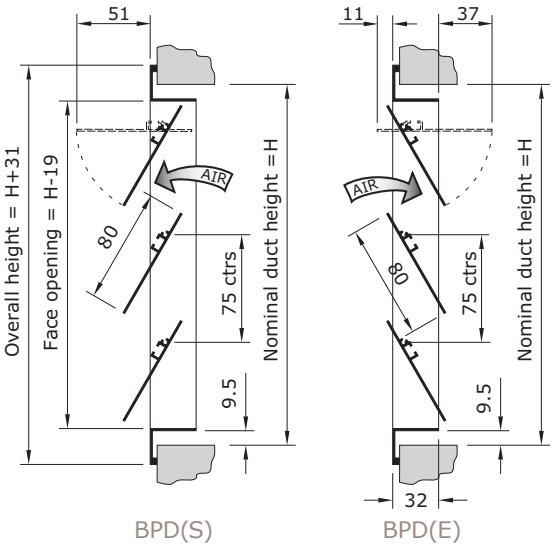
Special assemblies of grille and damper combinations are available to special detail.

Weights

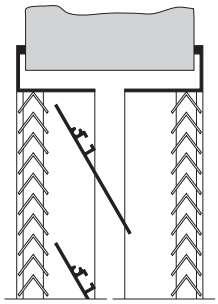
BPD 14 kg/m² face area

Manufacture

All dampers are constructed from aluminium alloy extrusions with mitred and welded/cleated frames. The blades are supported on plastic moulded bearing surfaces and blade weights are provided to vary control pressure.

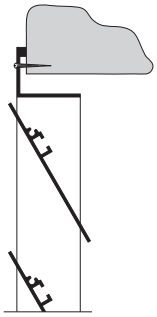


BPD(S) BPD(E)



Transfer grilles with internal back pressure damper blades

Screw through flange (standard)



To ensure satisfactory operation the damper pivots and blades must not be obstructed within the opening.

Openings and ducting must also be square across the face to prevent distortion of the frame.

Order Example

BPD(S)/400/175/SF/PPG9010

Type
Nominal width
Nominal height
Fixing
Finish

Back Pressure Dampers

BPD(S) / BPD(E)

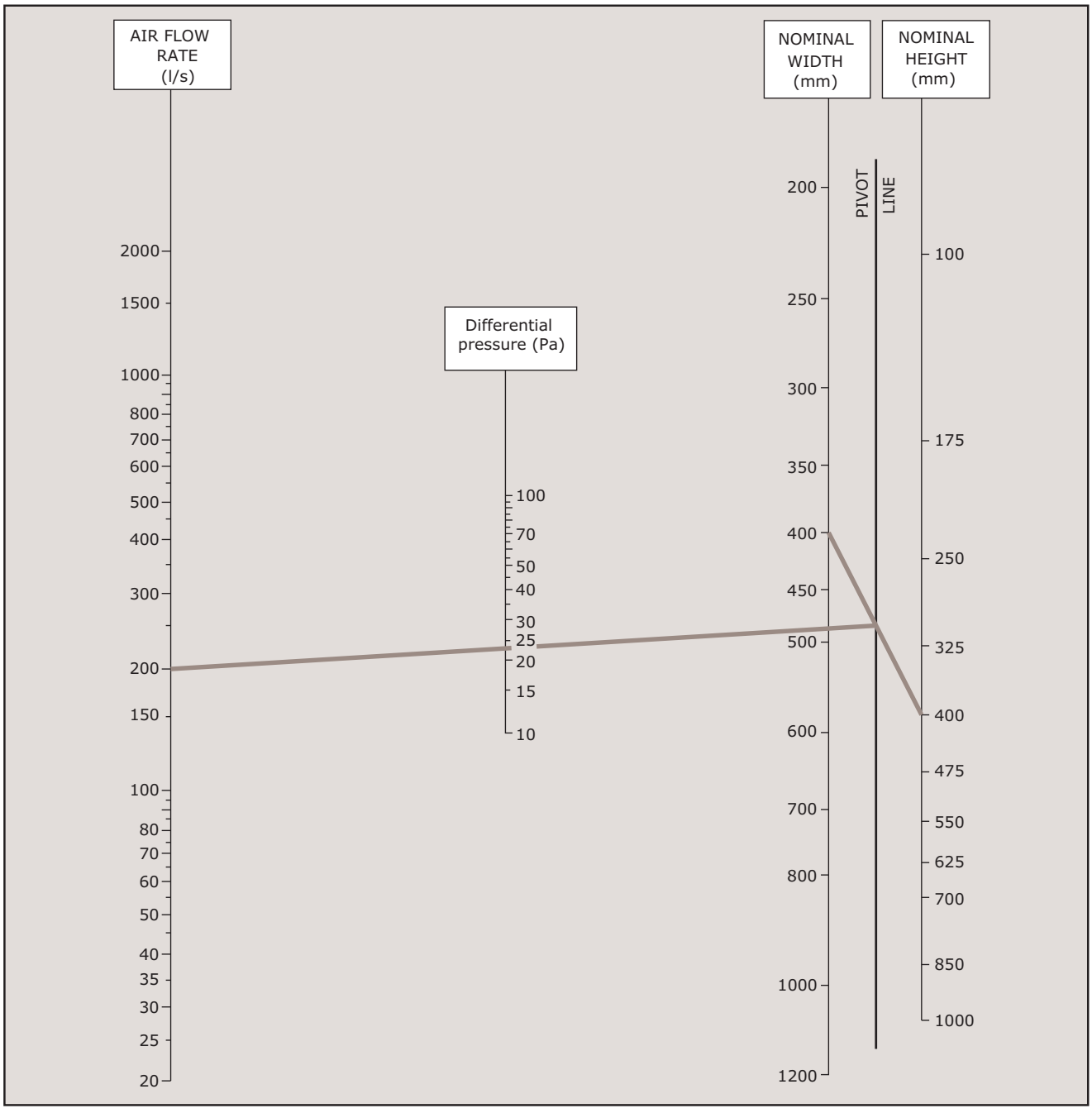
Performance Criteria

Performance is for supply or extract applications and is based on unweighted blades. Units should be selected for a given air flow rate and pressure differential. The preferred operating range is 10-50 Pa. For special applications it is possible to increase the pressure differential for any given size and air flow rate by adding blade weights

Selection example

For an air flow rate of 200 l/s and a required pressure of 23 Pa across a partition, select a 400mm x 400mm back pressure damper.

Performance Nomogram



Control Dampers

WDD / WDDX

Introduction

The Waterloo range of control dampers have been selected to provide positive control of air flow within ventilation and air conditioning systems. The range is suitable for flanged or spigoted connection within square, rectangular, circular or flat oval duct systems. Adjustable manually or electrically, the range comprises WDD control dampers and WDDX low-leakage dampers.

Product Description

WDD/F	Control damper, right angled frame with flange
WDD/SPG	Control damper. Circular connections
WDDX/F	Low-leakage damper, right angled frame with flange
WDDX/SPG	Low-leakage damper, Circular connections
M	Manual control with lockable/removable control knob operator
S	Spindle control, 12mm square, 100mm long for use with actuators. Waterloo use Belimo actuators that can be supplied and fitted on request

Features

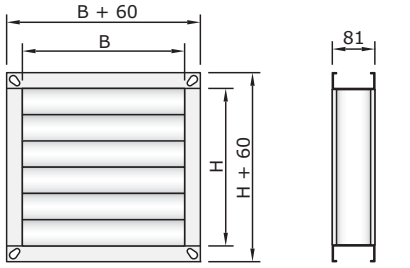
- Robust yet lightweight blade and frame construction
- Opposed aerofoil blade operation
- All operating gear out of ducted airway
- Blade position indicator
- Flanged version supplied with elongated bolt holes to it 20-35 mm flanges
- Fully enclosed blade linkage mechanism
- Folded edge flanges suitable for clamp & sealing strips
- Good adjustability characteristics even with small ducts

Weights

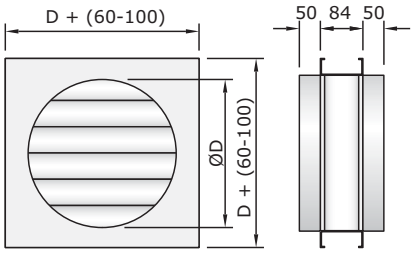
WDDX/F	10 kg/m²
WDDX/SPG	21 kg/m²

Dimensions

WDD/F	W 100 to 1000mm
	H 100 to 1000mm at 50mm intervals
WDDX/F	W 100 to 600mm
	H 100 to 600mm at 50mm intervals
WDD/SPG	D 100 to 1000mm
WDDX/SPG	D 100 to 600mm



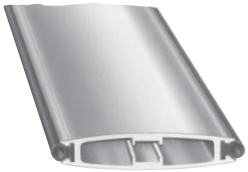
WDD-F
WDD-X-F



WDD-Spg
WDD-X-Spg

WDD Blade

WDDX Blade



Order Example

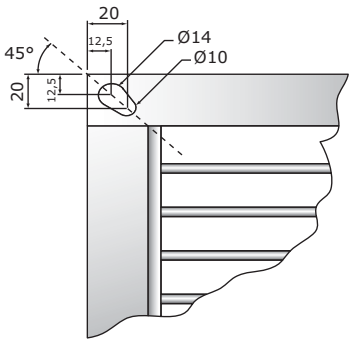
WDDF/300/300

Type
Nominal width
Nominal height

Control Dampers

WDD / WDDX

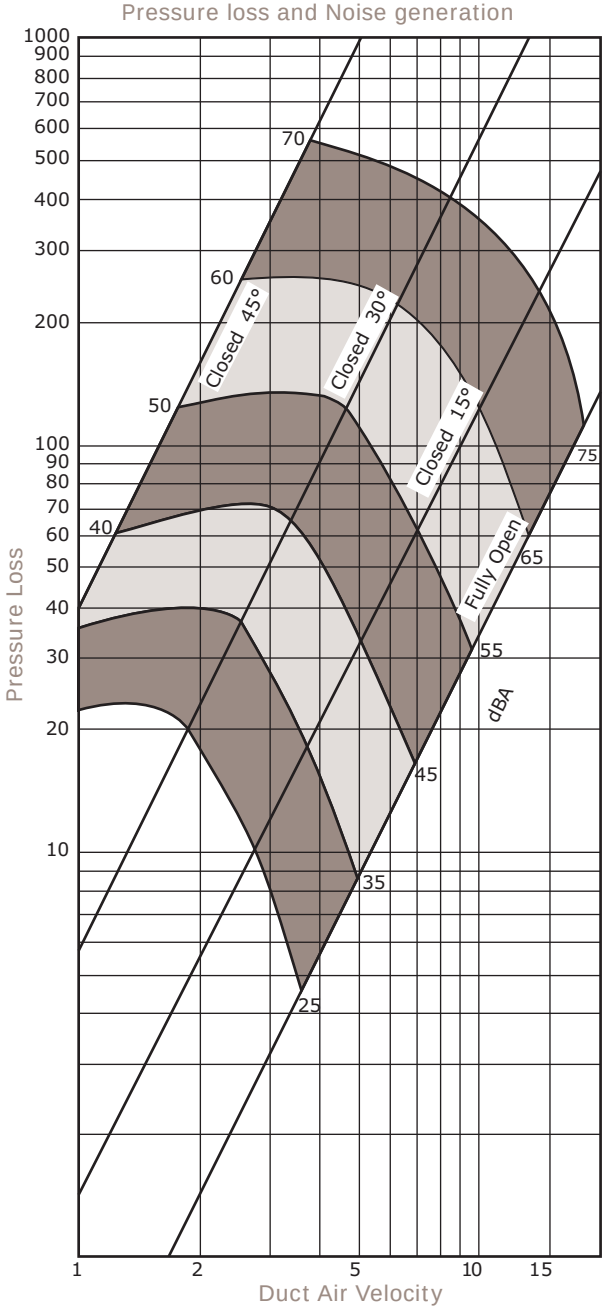
WDD-Spg-M



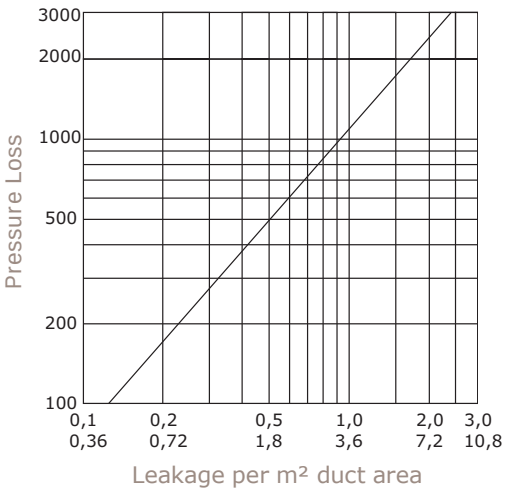
Selection

Duct area (m²)	Correction (dB)
0,01	- 10
0,05	- 3
0,10	0
0,15	+ 2
0,20	+ 4
0,50	+ 7
1,00	+ 10

Pressure loss and Noise generation



In duct blade leakage

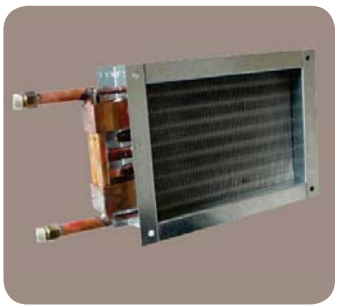


Hot Water Heaters

WHWQ

Introduction

The WHWQ is a LPHW heating coil assembly developed for the re-heating of airstreams in ventilation systems and is used in conjunction with the WVS Variable Air Volume damper series of products. Available with 1 or 2 rows as standard.



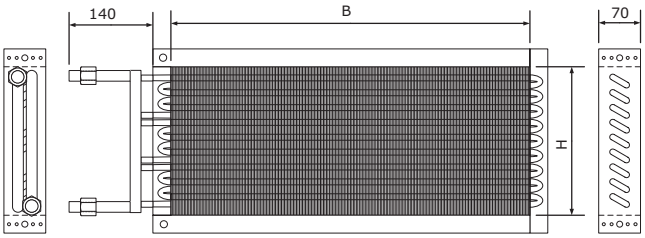
Product Description

WHWQ-1 Single row heater
WHWQ-2 Double row heater

Features

- High heating capacity
- Low air resistance
- Suitable for use with WVS
- Maximum working pressure: 1500 kPa
- Flange: Galvanised Steel (18 swg)
- Coil: Aluminium fins/Copper tubing
- 1 or 2 row coils as standard. 4 rows on request.
- Connection: ½" NPT

Type WHWQ 2 row re-heating coil



WVSV series

Model	100	125	160	200	250	315	355	400
B	300	300	300	400	400	400	600	600
H	200	200	200	250	300	350	400	400

Order Example

WHWQ-2 / 315
Type
Nominal size 350x400mm

Hot Water Heaters

WHWQ

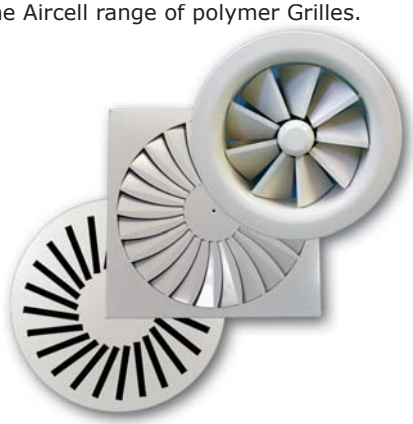
Performance Table

Model	Air Volume [m³/h]	Pressure Loss [Pa]	1 -Row Air in Temp 16 °C Water in 82 °C - out 71 °C				1 -Row Air in Temp 16 °C Water in 70 °C - out 55 °C				2 -Row Air in Temp 16 °C Water in 70 °C - out 55 °C				2 -Row Air in Temp 16 °C Water in 50 °C - out 40 °C			
			Q kW	Air out °C	Water Quantity L/h	Δ Pw kPa	Q kW	Air out °C	Water Quantity L/h	Δ Pw kPa	Q kW	Air out °C	Water Quantity L/h	Δ Pw kPa	Q kW	Air out °C	Water Quantity L/h	Δ Pw kPa
100	35	1	0.32	43.4	25	0.1	0.22	34.5	13	0.0	0.40	50.6	25	0.2	0.24	36.4	20	0.1
	106	9	0.61	33.3	50	0.3	0.39	27.0	24	0.1	0.83	39.6	50	0.7	0.50	30.2	45	0.6
	160	20	0.75	30.1	60	0.4	0.46	24.6	27	0.1	1.04	35.6	60	1.0	0.63	27.8	55	0.9
	213	33	0.85	28.0	65	0.5	0.51	23.3	30	0.1	1.22	33.3	70	1.3	0.74	26.4	65	1.2
	266	48	0.96	26.9	75	0.6	0.60	22.8	38	0.2	1.39	31.7	80	1.7	0.82	25.2	70	1.3
125	57	1	0.56	45.6	45	0.3	0.39	36.3	22	0.1	0.68	52.0	40	0.6	0.43	38.5	40	0.6
	168	9	1.07	35.1	85	0.9	0.70	28.5	40	0.2	1.41	41.3	80	1.9	0.86	31.4	75	1.7
	253	19	1.33	31.8	105	1.3	0.86	26.3	50	0.3	1.83	37.7	105	3.1	1.10	29.1	95	2.6
	337	32	1.55	29.8	120	1.6	0.99	24.9	57	0.4	2.17	35.4	125	4.2	1.30	27.6	110	3.4
	421	47	1.74	28.4	135	2.0	1.11	24.0	65	0.6	2.48	33.8	145	5.5	1.49	26.7	130	4.5
160	97	2	0.89	43.6	70	0.1	0.60	34.7	35	0.0	1.11	50.3	65	0.2	0.68	37.0	60	0.2
	279	10	1.65	33.7	130	0.3	1.04	27.3	60	0.1	2.23	40.0	130	0.8	1.34	30.4	115	0.6
	418	21	2.04	30.7	160	0.5	1.28	25.3	75	0.1	2.82	36.3	160	1.2	1.71	28.3	150	1.0
	558	35	2.37	28.8	185	0.6	1.46	23.9	85	0.2	3.33	34.0	190	1.6	2.01	26.8	175	1.3
	697	52	2.66	27.5	210	0.8	1.62	23.0	95	0.2	3.80	32.4	220	2.0	2.26	25.8	195	1.6
200	156	1	1.57	46.3	125	0.2	1.10	37.1	65	0.0	1.89	52.3	110	0.3	1.16	38.2	100	0.3
	439	8	2.94	36.1	230	0.5	1.96	29.5	115	0.1	3.85	42.3	220	1.1	2.33	32.0	200	0.9
	658	16	3.69	32.9	290	0.7	2.41	27.0	140	0.2	4.95	38.6	280	1.6	2.98	29.6	250	1.3
	878	27	4.33	30.8	340	0.9	2.77	25.5	160	0.2	5.94	36.3	340	2.3	3.55	28.2	300	1.8
	1097	40	4.87	29.3	380	1.1	3.10	24.5	180	0.3	6.79	34.6	390	2.9	4.08	27.2	350	2.4
250	240	1	2.52	47.5	200	0.4	1.80	38.5	105	0.1	2.99	53.3	170	0.9	1.85	39.1	160	0.8
	690	9	4.83	37.0	380	1.4	3.31	30.5	190	0.4	6.29	43.4	360	3.2	3.85	32.7	330	2.8
	1035	18	6.10	33.7	480	2.0	4.15	28.1	240	0.6	8.19	39.8	470	5.1	4.99	30.5	430	4.4
	1380	29	7.16	31.6	560	2.7	4.80	26.5	275	0.8	9.79	37.3	560	7.0	5.95	29.0	510	5.9
	1725	44	8.09	30.1	630	3.3	5.40	25.4	210	0.9	11.25	35.6	650	9.0	6.83	27.9	590	7.6
315	392	2	3.63	43.8	280	0.4	2.57	35.7	150	0.1	4.47	50.3	260	1.0	2.75	37.1	240	0.9
	1101	14	6.79	34.5	530	1.4	4.57	28.5	260	0.4	9.03	40.7	520	3.4	5.52	31.1	480	3.0
	1651	30	8.55	31.6	670	2.0	5.70	26.4	330	0.6	11.65	37.2	670	5.4	7.08	28.9	610	4.6
	2202	49	10.01	29.7	780	2.7	6.60	25.0	380	0.8	13.89	35.0	800	7.3	8.40	27.5	720	6.1
	2752	73	11.29	28.3	880	3.3	7.35	24.1	420	0.9	15.80	33.3	900	9.0	9.57	26.5	820	7.7
355	504	2	4.73	44.2	370	0.3	3.29	35.7	190	0.1	5.77	50.4	330	0.6	3.53	37.0	300	0.5
	1401	13	8.78	34.8	690	0.9	5.89	28.7	340	0.2	11.58	40.9	660	2.1	7.04	31.1	600	1.8
	2102	26	11.02	31.8	860	1.3	7.29	26.5	420	0.4	14.95	37.4	850	3.3	9.08	29.0	780	2.8
	2803	44	12.92	29.9	1010	1.7	8.46	25.1	490	0.5	17.87	35.2	1025	4.5	10.81	27.6	930	3.8
	3503	65	14.58	28.5	1140	2.1	9.41	24.1	540	0.6	20.54	33.6	1200	6.0	12.31	26.6	1060	4.8
400	647	2	6.22	44.8	485	0.5	4.39	36.4	250	0.2	7.54	51.0	430	1.2	4.65	37.6	400	1.0
	1783	13	11.53	35.4	900	1.6	7.89	29.3	450	0.5	15.22	41.7	875	4.1	9.30	31.7	800	3.5
	2674	26	14.56	32.4	1140	2.4	9.82	27.1	560	0.7	19.80	38.3	1150	6.6	12.00	29.5	1030	5.4
	3565	44	17.11	30.4	1340	3.2	11.41	25.7	650	0.9	23.55	35.9	1350	8.7	14.31	28.1	1230	7.4
	4456	65	19.36	29.1	1520	4.0	12.87	24.7	740	1.1	26.97	34.2	1550	11.1	16.33	27.0	1400	9.3

Waterloo Product Range

GRILLES

A complete range of products suitable for all wall, ceiling and floor applications. Most grilles are made from aluminium and have a range of fixed or moveable blades designed to give performance whilst remaining aesthetically pleasing to the eye. Grilles are made to customer specified sizes and colours (PPM/G); standard colour PPM9010 (20% Gloss White). The range is complemented by the Aircell range of polymer Grilles.



DIFFUSERS

Designed to be installed in various ceiling systems, we have a complete range to suit both performance and aesthetical requirements. Most diffusers are made from aluminium and can be ordered with or without plenum boxes for easy duct work. Diffusers can be ordered in customer specified colours (PPM/G); standard colour is PPM 9010 (20% Gloss White). This range is complemented by the Aircell range of polymer Diffusers.

ACTIVE AND PASSIVE CHILLED BEAMS

The finest quality range of high output active beams, used for ventilated heating and cooling applications. These units have 4 pipe coils to allow heating and cooling circuits to run simultaneously, giving constant and responsive control. The design allows a large optimum capacity and also allows the customer to specify the nozzle type and pitch for individual circumstances.

Active beams are made from steel to a large range of customer specified sizes and as such are suitable for various different ceiling systems. Standard finish is PPM 9010, however other (PPM/G) colours are available on request.

AIR VOLUME CONTROL DAMPERS

Pressure independent Variable Air Volume and Constant Air Volume dampers made from zintec plate. Most volume dampers are regulated with an electronic motor and sensors and are calibrated to customer specifications before delivery.

The Constant Air Volume damper requires no power source as it is controlled via a mechanical device and calibrated before delivery. All volume dampers can be ordered with a single or double (insulation) skin.

EXTERNAL LOUVRES

A quality range of products for external wall applications. Made from aluminium, with birdscreen or insect screen options. All louvres are made to customer specified sizes and (PPM/G) colours; standard colour is PPM 9006.

DISPLACEMENT

A full range of recessed, semi-recessed, floor, wall and corner units providing high ventilation efficiency and excellent comfort. The very low pressure involved also offer quiet installations. Displacement units are available as wall or floor mounted, or indeed integrated within the architectural design.

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July 2019