AMS
AIR MOVEMENT SUPPLIES

"Whether you think you can or you can't, you're right."
— Henry Ford

At AMS we believe we can.

COMPLETE RANGE OF

CONTROL DAMPERS

(MANUAL OR AUTOMATIC) FOR VENTILATION DUCTWORK SYSTEMS

Tested to Eurovent 2/2.

Leakage to EN 1751, EN 1507, EN 12237 and DW143.

Suitable for DW144.

Suitable for EN 1505 and EN 1506.

Pressure Relief to EN 12101-6 (Fire Rated).

AMS
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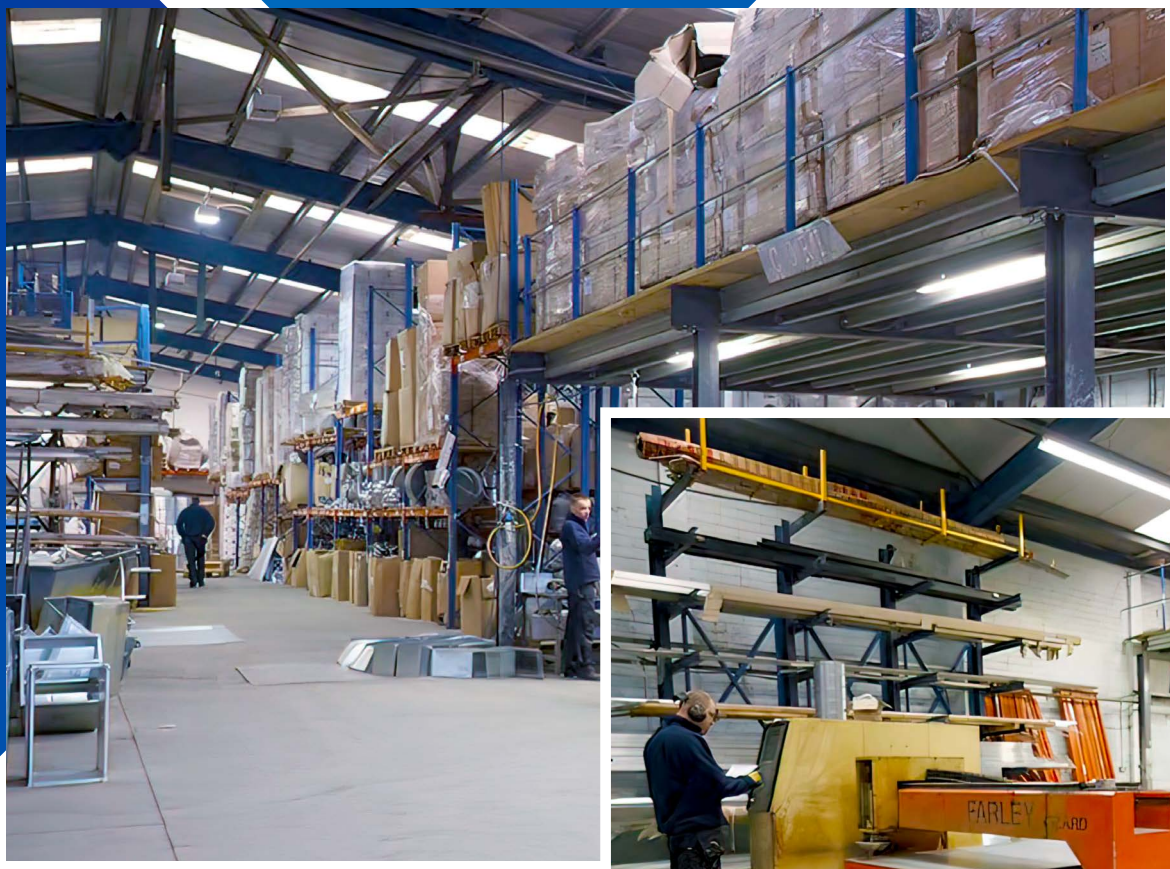

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Company profile - ISO 9001:2015

AMS Air Movement Supplies has served the Irish market under many names since 1998. We offer a complete package that is unrivalled as we are the only Irish manufacturer of grilles, dampers and fire rated ductwork. Our 40,000 sq. foot warehouse contains a vast array of diffusers, fans, flexibles and channels. Our turnaround times are renowned and we are acutely aware how much time costs to a delayed contractor.

We are **ISO 9001** certified and have completed an FPC *(Factory Production Control)* audit which is appraised annually and ensures the quality of all our products. Adherence to strict environmental protection policies and manufacturing methodology produces efficiency in materials that has made us one of the lowest producers of metal waste in Ireland.

Technical support and training

AMS Air Movement Supplies know the importance of getting a suitable fire system and have been involved with testing for over 15 years. We therefore provide a technical support service to all our clients and can provide a Continuing Professional Development (CPD) session on the latest EN regulations for your staff.

"Quality means doing it right when no one is looking."
— Henry Ford

AIR MOVEMENT SUPPLIES

COMPLETE RANGE OF CONTROL DAMPERS

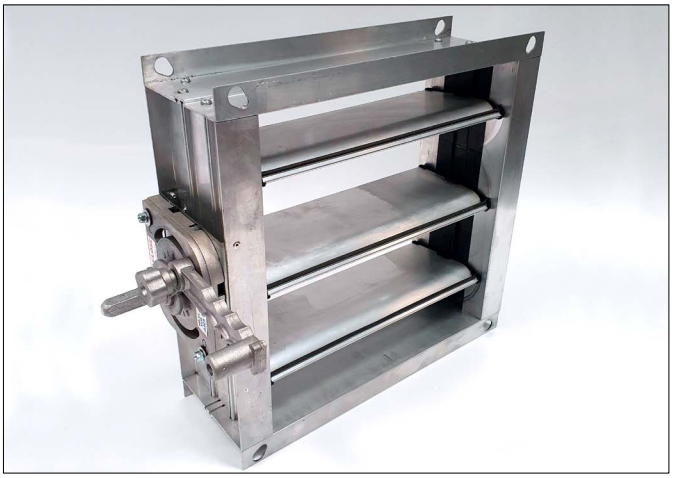
(MANUAL OR AUTOMATIC) FOR VENTILATION DUCTWORK SYSTEMS

CONTENTS

1. HD/LL – Heavy Duty/Low Leakage Damper (Shut off)

Introduction

For control, balancing and shut off of supply and extract air systems where high pressures and velocities may be experienced. All dampers are fitted with opposed blade action, airfoil blades as standard. The blades are adjusted via the robust, hand operated, lockable quadrant or with an optional extended spindle suitable for motorisation. The linkage system is enclosed and positioned out of the airstream. Casing leakage conforms to HVCA specification DW144 and Eurovent 2/2 classes A on casing leakage and Class 3 on blade leakage.



Construction

The casing is available fully flanged or with square/rectangular, circular or flat oval spigots and is manufactured from galvanised mild steel. The blades are extruded aluminium airfoil section, low leakage model is complete with blade and side seal gaskets. Where a height of less than 100mm is required a blank plate fills the space (i.e. 300×350).

Size

From 300×100 to 1300×1300 (single section) and up to 3900 (W) × 1300 (H) with a single drive. Multiple assemblies can also be supplied. Low leakage model can be provided for all sizes (divisible by 100). Height is always +10mm to allow for blade gaskets (i.e. 400×400mm will be 400×410mm). Depth is 125mm from front to back.

Specifications

Unless stated otherwise, flange models are suitable for classes A, B, C & D of DW144, with spigot models suitable for classes A, B & C.

Conforms to Eurovent 2/2 classes A-C (see results page 8).

Independent performance tests for pressure loss and leakage. Test reports 331552 – Feb 2016.

Blades

The 100mm wide blade is offered as standard as an extruded aluminium airfoil section. All blades are fitted to 19mm spindles. All models are available with opposed blades. Fitted to the ends of the aluminium blades are end seal flocked caps to alleviate, noise generation and minimize air leakage. All blades are fitted with rubber seals. This requires the height to be increments of 10mm to achieve leakage performance (i.e. 300×300mm is 300×310mm high).

Multiple Assemblies

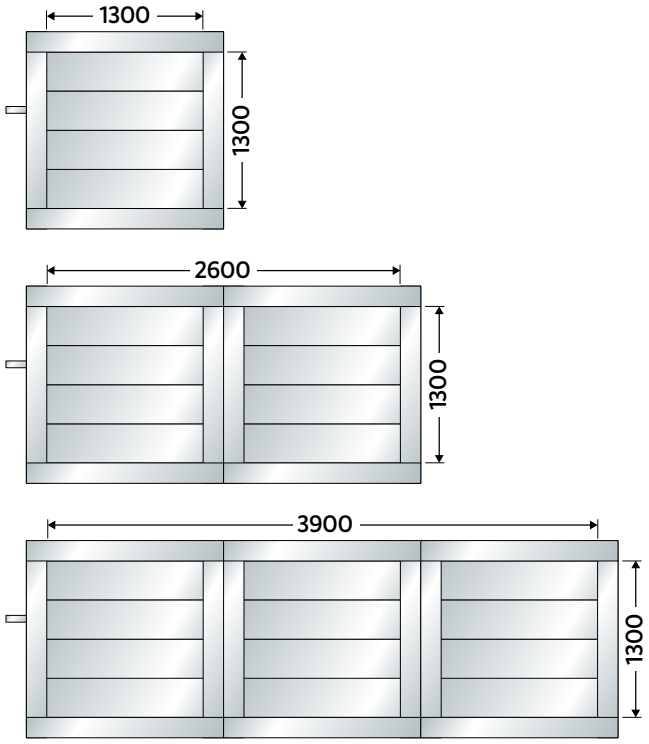
Illustrated below are several variants to multiple section units. Blade lengths are up to 1300mm with 30mm wide centre mullions used where case widths extend to sizes greater than maximum blade length.

Low Leakage Model

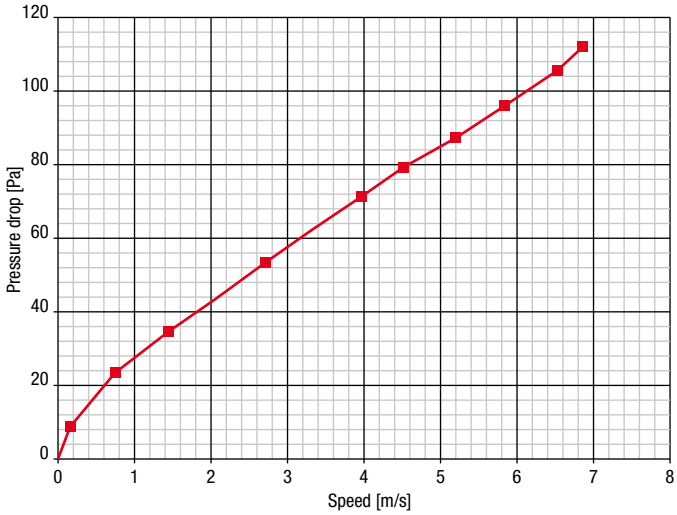
It is important to note that the low leakage model is only supplied up to 1300mm in width and height in a single section with multiple sections supplied for units greater than 1300mm up to max 3900×1300 (single drive).

When there are transportation restrictions, large multiple units may be shipped in individual sections for site assembly by others (on request). Joining strips are supplied un-drilled unless requested otherwise.

Multiple sections / Single Drive:



Test report No. 224203
Flow rate/Pressure drop



Special Note:

AMS can manufacture to individual specifications and applications. Illustrated above are standard variants with other variants available to order.

For applications which necessitate the blades to be installed vertically, AMS sales office must be informed to ensure such sizes are within working norms.

Single and Multiple Damper arrangements are designed to be installed with blades in the horizontal plane. Drive spindle is always fitted centrally. Alternative positions are possible to special order.

Weight Chart

Damper Height *(mm)*	Damper Width (mm)									
	200	300	400	500	600	700	800	900	1000	1300
100	3.0	3.0	4.0	5.0	6.0	6.0	7.0	8.0	9.0	15.0
200	4.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	18.0
300	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	20.0
400	6.0	7.0	9.0	10.0	12.0	13.0	14.0	15.0	16.0	25.0
500	7.0	8.0	10.0	12.0	13.0	14.0	16.0	17.0	18.0	27.0
600	8.0	10.0	12.0	13.0	15.0	17.0	18.0	19.0	21.0	29.0
700	9.0	12.0	13.0	16.0	18.0	20.0	21.0	22.0	23.0	32.0
800	10.0	13.0	14.0	17.0	19.0	21.0	23.0	25.0	26.0	34.0
900	12.0	14.0	16.0	19.0	21.0	23.0	24.0	26.0	27.0	36.0
1000	13.0	15.0	18.0	21.0	23.0	26.0	27.0	28.0	32.0	40.0
1300	15.0	17.0	20.0	25.0	29.0	33.0	38.0	40.0	45.0	60.0

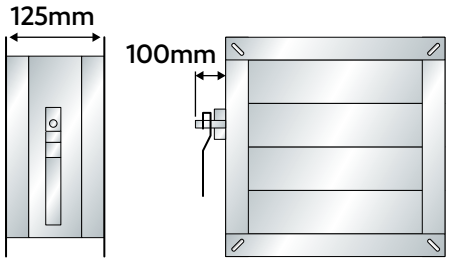
(Kg)(Flangefit Model – Aluminium Blades)

These values have been rounded up and down to whole numbers and are illustrated for estimation purposes only.

Control Options HD/LL

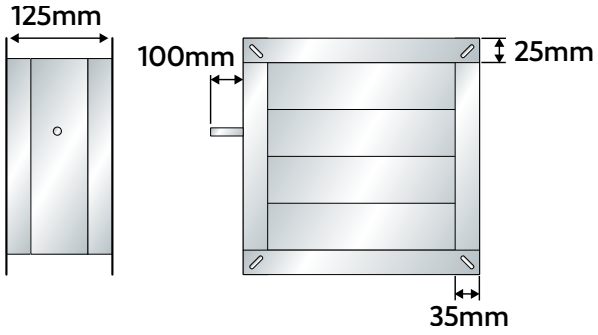
Option HC - Hand Control (as standard)

Our unique hand-lockable quadrant is supplied complete from the factory. Conversion to motorised is easily completed by removing quadrant handle leaving extended spindle exposed.



Option ES - Extended Spindle

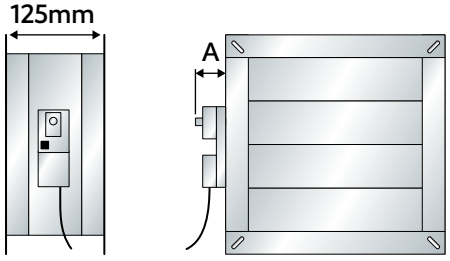
When the specification requires the HD Series Damper to be supplied for motorisation by others, AMS supplies the damper with a spindle 200mm in length, leaving a generous protrusion to mount motor of approx. 100mm.



Option EM - Electric Motor

The HD Series Damper can be supplied factory fitted with electric actuators offering a choice of methods of operation. A = will vary depending on the type of motor specified. For additional technical details, please contact AMS Sales Office for data sheet. Height is always +10mm to allow for blade gaskets (i.e. 400×400mm will be 400×410mm).

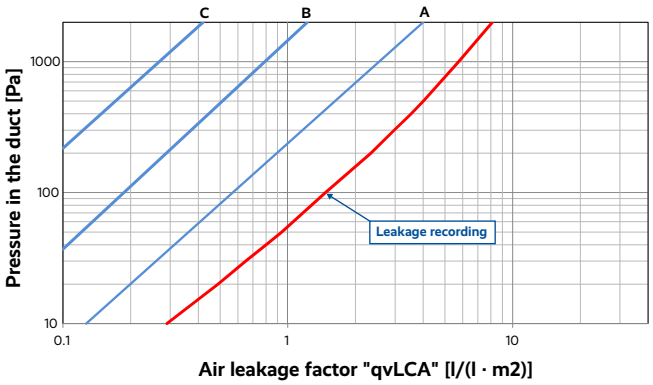
Note: H nominal is always + 10mm



Performance, Case + Blade Leakage

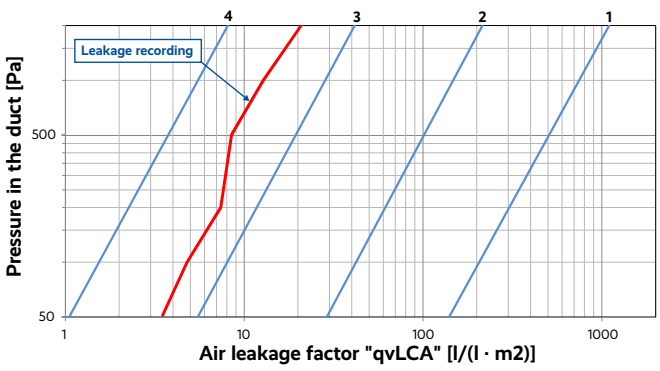
Performance Characteristics

Case leakage Class "A"



Red = HD/LL performance

Leakage through closed blade "3"



Red = HD/LL performance

Torque Chart For Motor Selection (Passive conditions)

Actuating Force Class 2 EN 1751

	5 Nm
	10 Nm
	15 Nm

Height ↓	100/700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000
110/710																								
810																								
910																								
1010																								
1110																								
1210																								
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1410																								
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1610																								
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1810																								
1910																								
2010																								
2210																								
2310																								

Note: For pressure up to 500Pa use 10 Nm @ 0.5m² up to 1.5m² and 15 Nm above 1.5m².

Operating Temperature

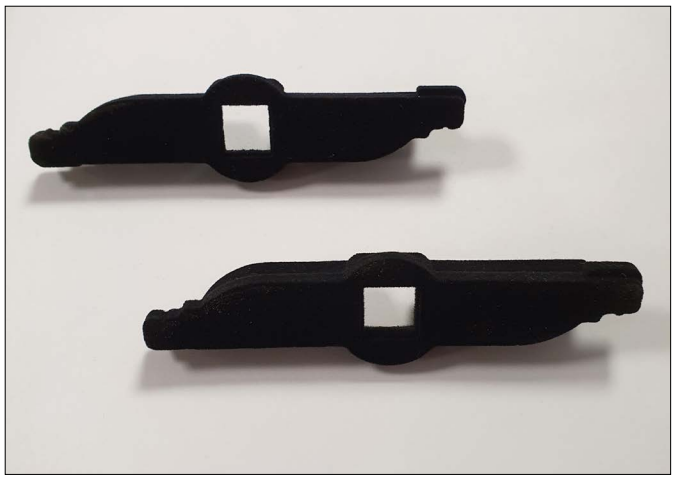
10°C to + 110°C as standard.

Blade Edge Seals.

TPV used in gasket resists up to 120°C.

Construction Components

Flocked blade end caps



Flocked end caps uniquely provide a better low leakage performance by minimizing the friction between the blade and the casing. As standard moulds will achieve a high standard of leakage.

Quadrant handle and shaft

All aluminum handle and square shaft guarantees non slippage between the drive handle and the operation (blade movement). This unique handle offers more leverage to enable larger damper sizes to be opened and closed with minimum force.

Side Seal Gasket

Flocked endcap comprising of polypropylene and soft part TVPS.

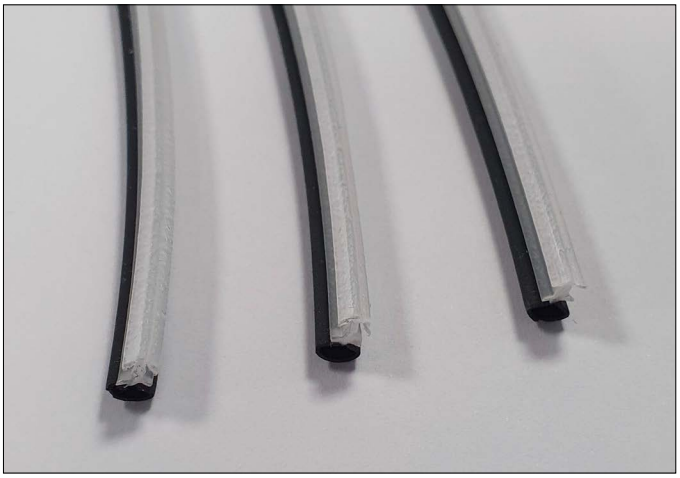
HD/LL a CLASS 3 Damper, compliant to the EN 1751:2014 norm, certified by 'ISTITUTO GIORDANO' (certificate: 331552).

We introduced a new special flocked component, NG007A_B and a new gasket, G0013, which both guarantee a perfect air tightness of the damper according to the standard required by the above mentioned norm.

The CLASS 3 damper has hidden gears frame which allow a constant protection from the dirt and guarantee the proper rotation of the blade for a longer working life.

The new side seal is comprised of a unique TPVS – soft part and polypropylene – hard part, and is fastened on both sides of the blade, in order to guarantee the air tightness required by the EN 1751:2014 norm.

Class 3 Gasket



Test Results (EN 1751)

Case leakage

Nominal pressure [Pa]	Test pressure [Pa]	Measured flow rate [Pa]	Flow Rate [l/s]	Reference area [m2]	Damper leakage l/(l-m2)
10	10	0.5	0.14	0.5	0.29
20	20	0.9	0.25		0.49
30	30	1.2	0.33		0.65
40	40	1.4	0.4		0.8
50	50	1.7	0.47		0.94
100	100	2.6	0.73		1.47
200	200	4.2	1.17		2.34
300	301	5.4	1.49		2.98
400	400	6.4	1.77		3.54
500	501	7.2	2.01		4.01
1000	1007	10.4	2.88		5.77
2000	2000	14.6	4.06		8.12

Leakage through closed blades(s)

Nominal pressure [Pa]	Test pressure [Pa]	Measured flow rate [Pa]	Flow Rate [l/s]	Reference area [m2]	Damper leakage l/(l-m2)
50	51	12.6	3.5	1	3.5
100	100	17.3	4.8		4.8
200	200	26.5	7.4		7.4
500	502	30.7	8.5		8.5
1000	1000	46	12.8		12.8
2000	2010	75.4	20.9		20.9

Test report No. 331552

HD-LL-VCD meets the requirements of standard EN 1751:2014 for the highest class A relating to case leakage and class 3 (2nd highest rating) relating to leakage through closed blade(s).

2. VCD – Opposed Blade Damper (Balancing only)

Introduction

For duct installations to balance/regulate airflows all spindles revolve in low maintenance nylon bushes which are fitted within pressed inserts. Precise blade positioning is achieved via a robust dual-purpose quadrant and spindle assembly, operating the linkage mechanism which is located outside of the airstream.

The quadrant assembly is designed to facilitate simple conversion to motorisation with an additional component of a new spindle.

Construction

The standard case construction is aluminium throughout, blades are 50mm aerofoil design and come with tear drop pre-punched flange connection holes or with galvanised spigots for round ductwork.

Sizes

Infinite sizing capability from 100mm² to 750mm² and from 100mm diameter to 750mm diameter.

Specifications

Unless stated otherwise, flange models are suitable for use in DW144 low pressure system to balance airflow legs connected to single diffuser.

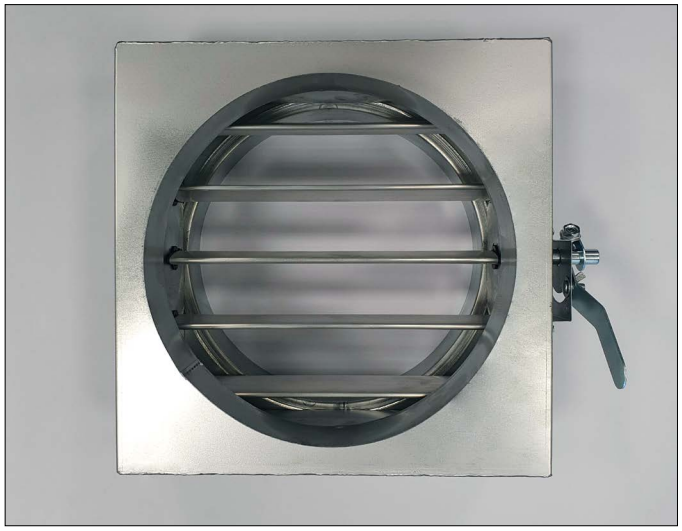
Blades

The 50mm wide extruded aluminium airfoil section blades are fitted to 12.5mm diameter spindles. All models are available with opposed blades.

VCD

The VCD is the preferred choice to the single blade damper see p.14, which is approved by DW 144, however an opposed blade damper offers far more precise control.

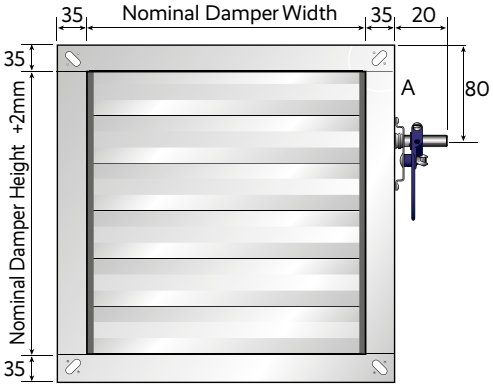
VCD-R

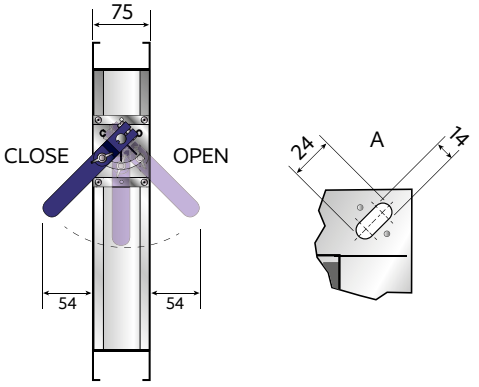


VCD-R dampers are opposed blade using 50mm aluminium aerofoil (low resistance blades) which makes an ideal solution to a balanced system with control available to above 90%.

Dimensions

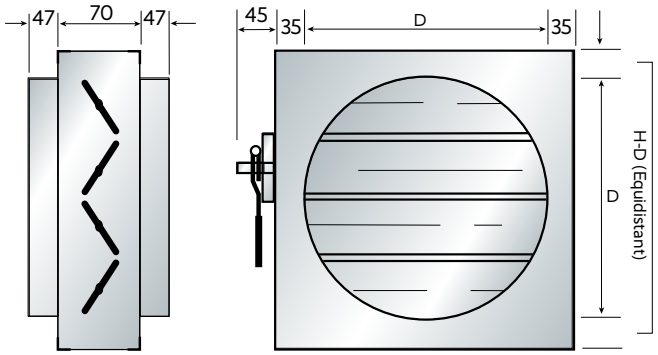
Standard VCD





W x H	100mm to 750mm square
B	20mm, 25mm and 30mm to order (35mm standard)
*	35mm flange – 25mm spindle protrusion
Depth	75mm square – 70mm round

VCD-R



D = 100mm to 750mm diameter

VCD/R		
Depth (D) Ø	**Width (W)**	**Height (H)**
95	165	165
120	190	190
145	215	215
195	265	265
245	315	315
295	365	365
310	380	380
345	415	415
395	465	465
445	515	515
495	565	565
545	615	615
595	665	665
645	715	715
695	765	765
745	815	815

Multiple Assemblies (Multiple drives)

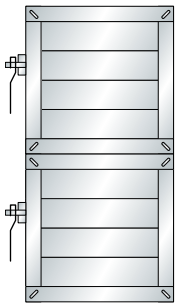
Illustrated below are several variants of multiple section units. Where sizes exceed 750mm square, multi-section units can be supplied.

All multiple units are shipped as individual sections for site assembly by others. Unless requested, joining strips would not normally be supplied drilled.

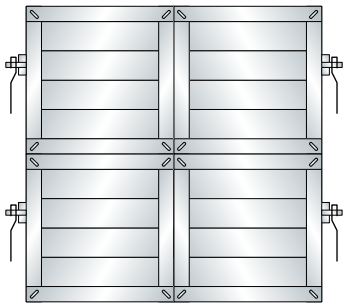
VCD dampers can be installed in the vertical or horizontal position. It is recommended that for sizes greater than 750mm width or height, the HD/LL Damper is used (see page 4).

A. Can be up to 750W × 1500H, **B.** Can be up to 1500H × 750W, or **C.** up to 1500W × 750H (multiple drive).

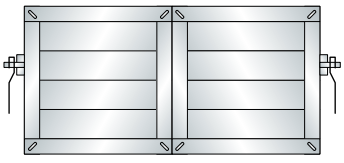
A. Up to 750W × 1500H



B. Up to 1500W × 1500H



C. Up to 1500W × 750H

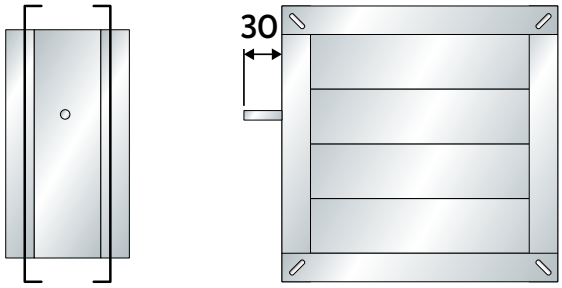


Control Options

Hand control is standard.

Option ES – Extended Spindle

When the specification requires the VCD Damper to be supplied for motorisation by others, AMS supplies the damper with a 12.5mm diameter spindle, 50mm in length, based on a 35mm flanged damper.



Option EM – Electric Motor

The VCD Damper can be supplied with the following control motors fitted:

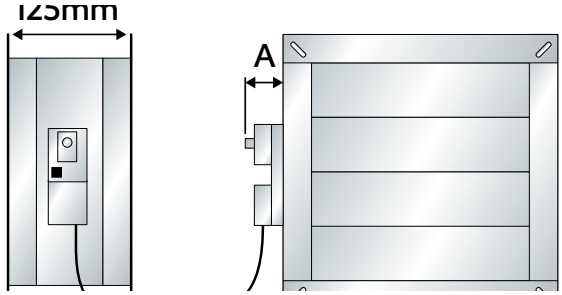
Open/Close operation:

A = 70mm, 15Nm

A = 80mm, 30Nm

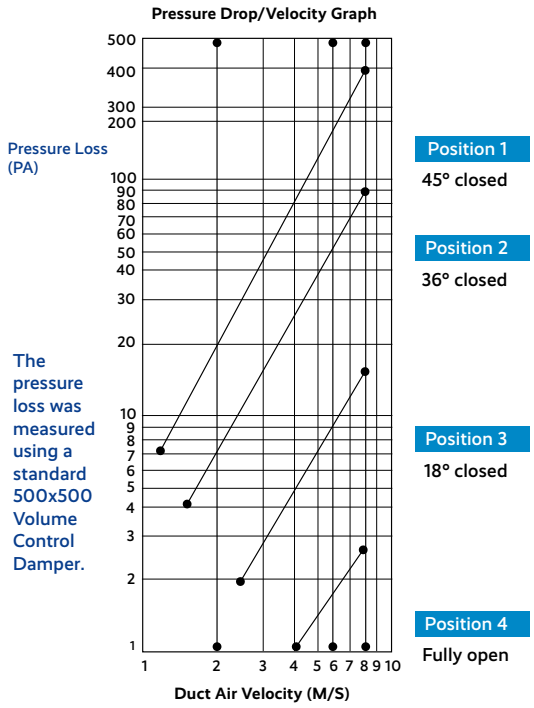
Spring Return operation:

A = 95mm, 15Nm

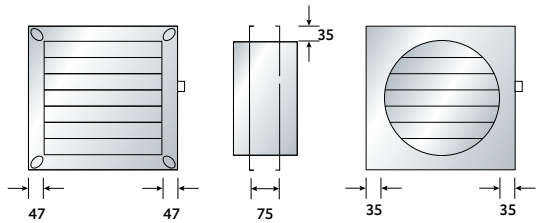


Performance, Weight and Torque Data

Performance Characteristics



The pressure loss was measured using a standard 500x500 Volume Control Damper.



Torque Chart

Differential pressure (Pa)	Damper Size (mm)					
	200 × 200		500 × 500		750 × 750	
	Nm	lb/ins	Nm	lb/ins	Nm	lb/ins
500	2.0	18.0	4.0	35.0	7.5	66.0
1000	4.0	35.0	7.0	62.0	10.0	88.0

Weight Chart (kg)

Damper height (mm)	Damper Width (mm)					
	200	300	400	500	600	750
100	1.5	2.0	2.5	3.0	3.5	4.0
200	2.5	3.0	3.5	4.0	4.5	5.0
300	3.0	4.0	4.5	5.5	6.0	6.5
400	4.0	5.0	6.0	6.5	7.5	8.5
500	4.5	5.5	6.5	7.5	8.5	9.5
600	5.5	6.5	7.5	9.0	10.0	11.0
750	6.0	7.5	9.0	10.5	12.0	13.0

3. DRIS – Iris Damper

The ideal solution for the exact and quick air flow measuring and regulation.

- Low noise level
- Operation independent of flow direction
- Fully openable for cleaning of duct tight construction
- Solid construction

Construction

The IRIS DAMPER DRIS is composed of regulation plates, regulating nut and regulation scale plus manometer connections and casing.

Installation

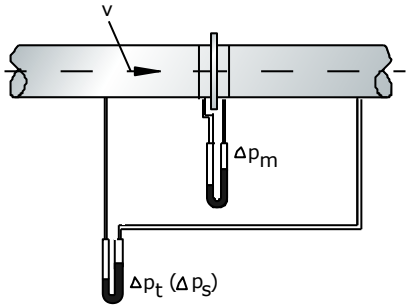
The IRIS DAMPER is secured to the ducting with rivets. For vertical mounting, ensure the weight of the interconnecting ductwork is fully supported. Refer to the table for recommended safety distances.

Regulation and measurement of air flow

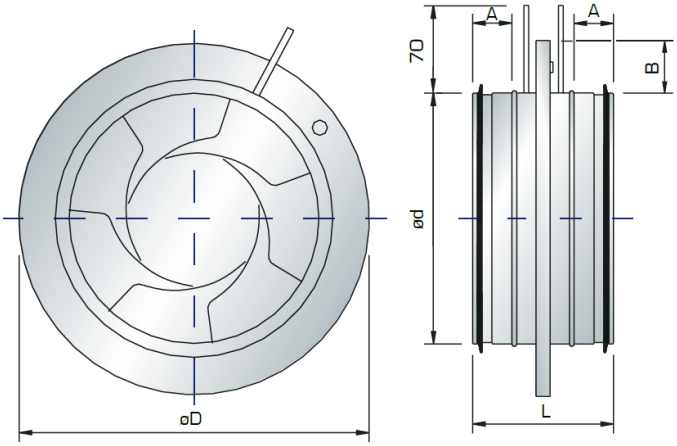
The regulation plates form a virtually ideal measuring orifice which enables an easy and reliable measurement of the air flow. To determine the airflow, measure the pressure difference Δp_m at the manometer connections and check the corresponding airflow from the regulation chart.

The chart is shown on the damper casing and in the separate information for air flow regulation and measurement (the selection diagrams do not serve the air flow measurement).

The adjustment of the Iris is simple, all that is needed is a standard 13mm spanner and the damper locks in the right position automatically.



Dimensions in mm



Size	Ød	ØD	L	A	B
80	79	125	115	33	22
100	99	165	115	27	32
125	124	188	115	27	32
250	249	335	135	33	42
315	314	405	140	33	47
400	398	525	150	46	62

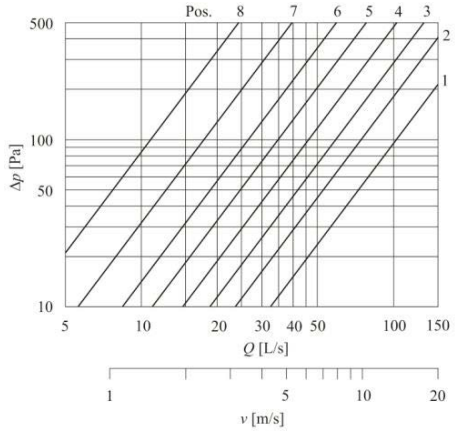
Note: Other sizes available on request.

Standards and Options

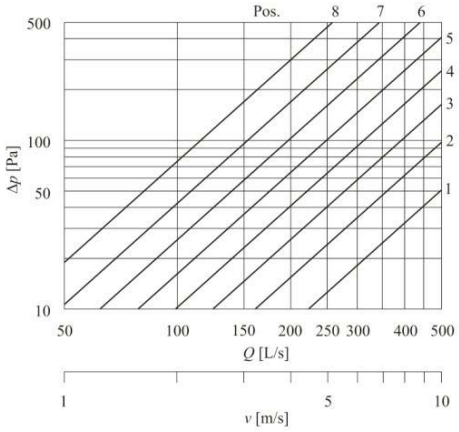
1. DRIS comes as standard in galvanised sheet metal.
2. Options available include stainless steel.
3. DRIS dampers provide a perfect aperture throughout its closing operation to ensure a perfect reading of airflow and pressure for systems that require such accuracy.

Airflow, pressure drop and damper position

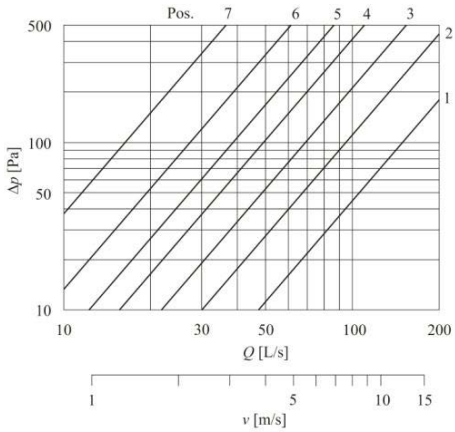
Dris 100



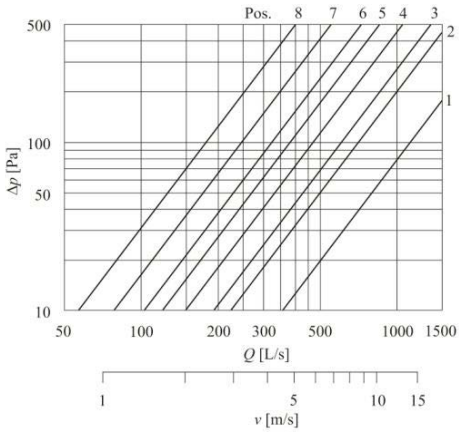
Dris 250



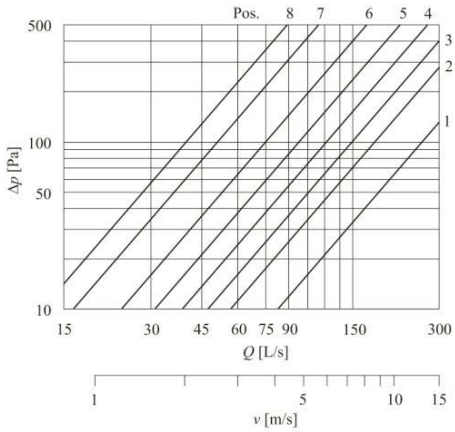
Dris 125



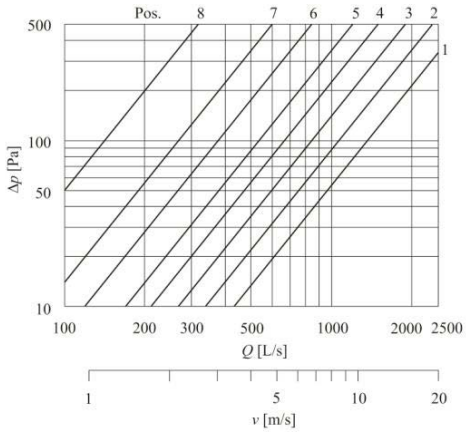
Dris 315



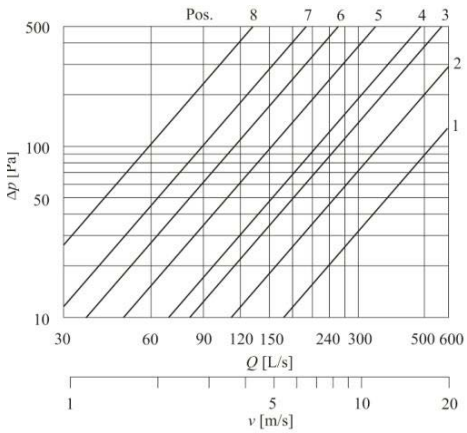
Dris 150



Dris 400



Dris 200



Note: These properties are also dependent on humidity and the temperature of the air inside and outside of the HVAC system.

Other sizes available on request.

Airflow = l/s.
Pressure = Pa.

Position indicator shown on handle.

4. SBD – Single Blade Damper (Balancing)

Description

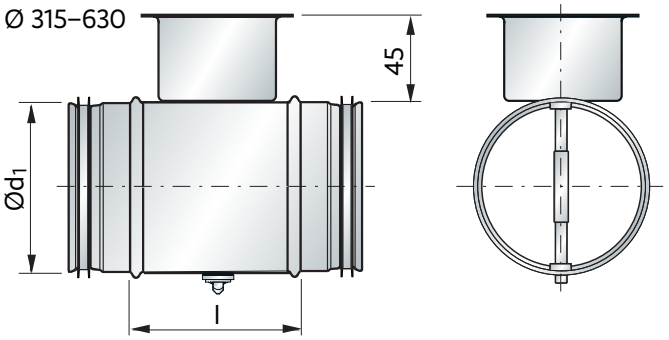
SBD dampers are ideal for balancing fan coil units or A/C units with low pressure (under 25Pa) providing multiple diffuser outlets for one fan coil. SBD sizes and types are approved in DW144 up to 315Ø and are a suitable fitting to match standard spiral ductwork. This unit can be fitted on the outside of the diffuser plenum, or ductwork legs to achieve a balanced system.

Construction

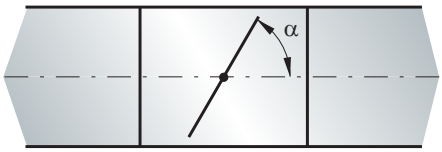
- Galvanised steel casing and blade.
- Manual operating handle with indicators of open and closed position.
- Suitable for use in DW 144 and EN 1506.

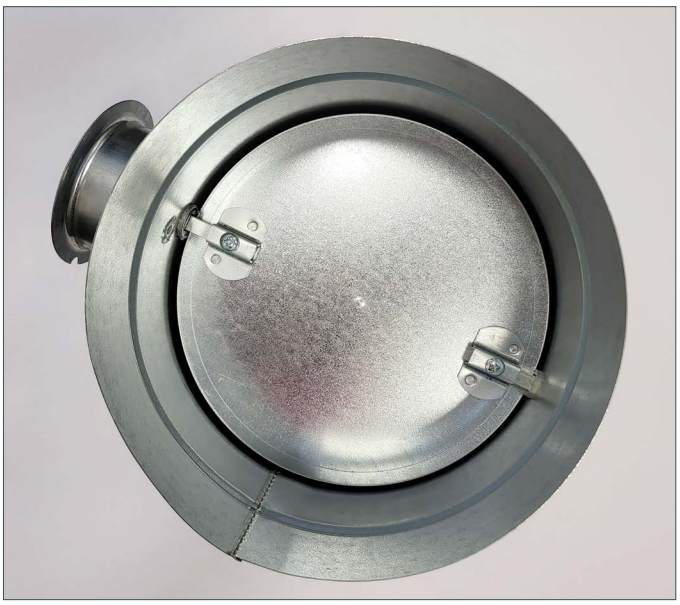
Dimensions

Ød$_1$	l (mm)	m (kg)
100	100	0.46
125	100	0.55
150	100	0.70
160	100	0.75
200	100	0.90
224	100	1.10
250	100	1.30
300	100	1.50
315	100	2.00



Operations





Options

- Other sizes available on request.
- For automatic motorized version see AGU-R page 15.
- Not suitable for 'shut off' purposes.
- Typical gauge is 0.6mm up to 315Ø.
- Quadrant handle may vary on the model. All handles come with a locking mechanism for commissioning purposes.

5. AGU-R – Shut Off Single Blade Duct Damper

Description

The shut-off dampers are appropriate when the ductwork closure must be airtight. The EN 1751 described test method was applied to test air tightness. AGUJ dampers met the highest airtightness class C4.

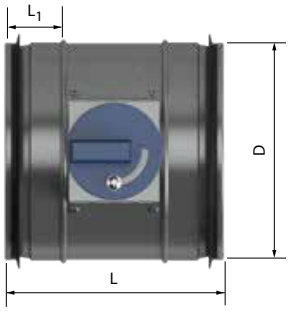
Dampers are designed for cladding with up to 50 mm thick insulation. Are used in ventilation or air conditioning systems with nominal pressure up to 1000 Pa.

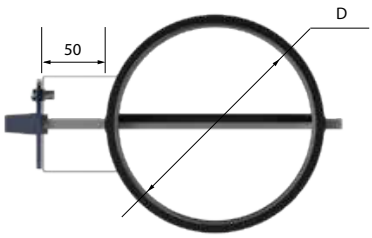
The damper closure angle range is 0˚ to 90˚ and can be read on the handle (R-type) or actuator (M – type) scale.

Regulating airtight shut-off dampers are made of galvanized steel and consist of casing, blade and operating mechanism (manual or motorized). Nominal diameter of the dampers conforms to nominal diameter of the air duct to be connected in acc. to EN 1506.

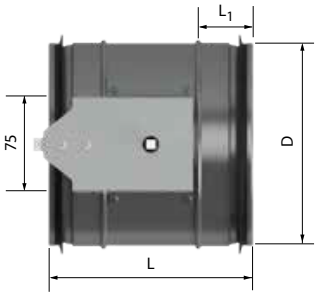
Stainless steel version is available on request.

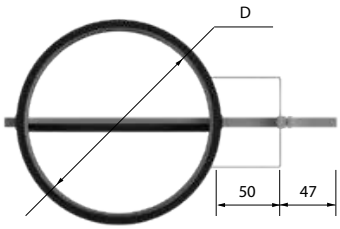
AGUJ-R with manual control





AGUJ-M with motorized control

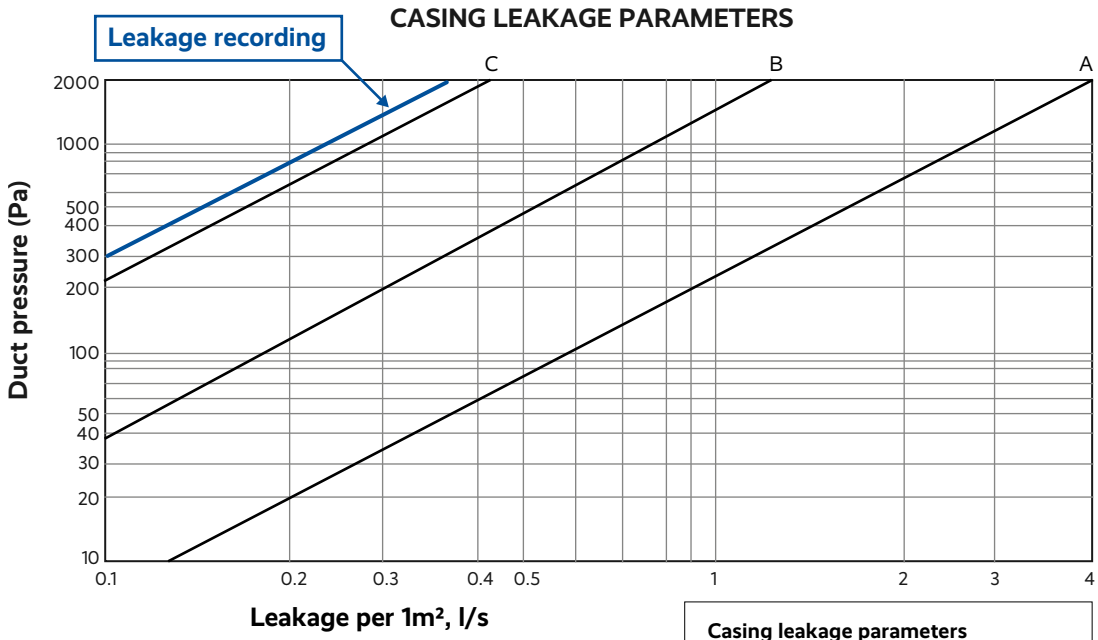




	Cross-sectional area (m^2)	L_1	L	AGUJ-R weight (kg)	AGUJ-M weight (kg)
100	0.007	40	160	0.48	1.98
125	0.012	40	160	0.59	2.09
160	0.019	40	160	0.75	2.25
200	0.031	40	160	0.86	2.36
250	0.048	40	200	1.28	2.78
315	0.077	40	252	1.70	3.20
355	0.098	65	284	2.81	4.31
400	0.125	65	320	3.43	4.93
500	0.194	65	400	8.76	10.26

Technical Data

Casing leakage parameters EN 1571 Class "C"



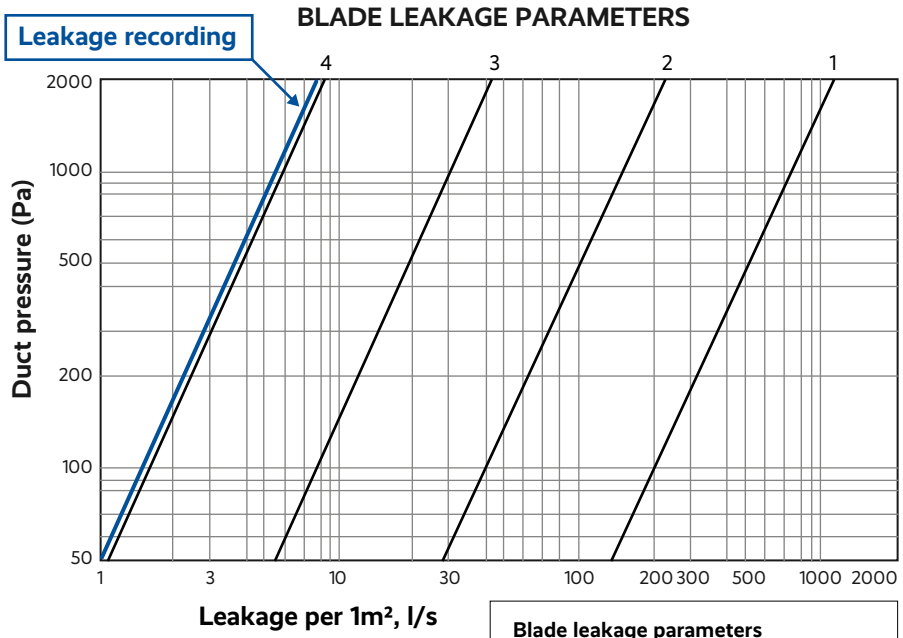
Casing leakage parameters

A, B, C – leakage class

X – leakage factor corrected to 1m², l/s

Y – duct pressure, Pa

Blade leakage parameters EN 1571 Class "4"



Blade leakage parameters

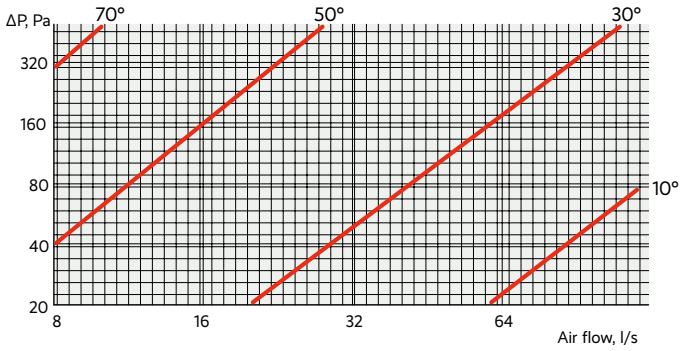
1, 2, 3, 4 – leakage class

X – leakage factor corrected to 1m², l/s

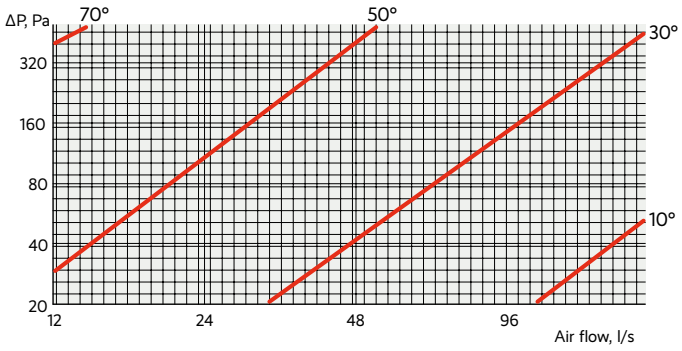
Y – duct pressure, Pa

Pressure drop parameters

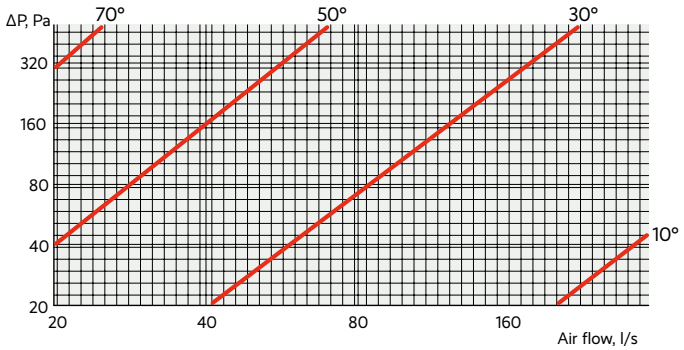
Pressure drop Ø100 airtight damper



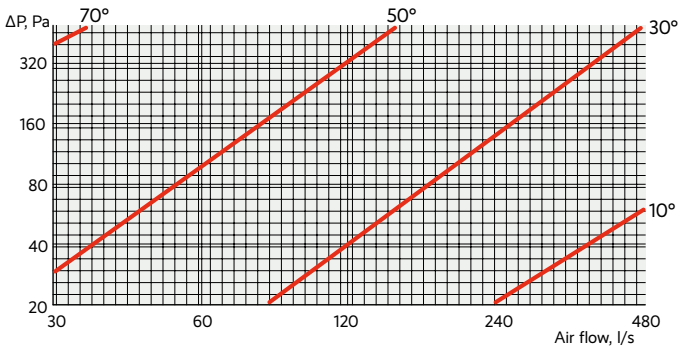
Pressure drop Ø125 airtight damper



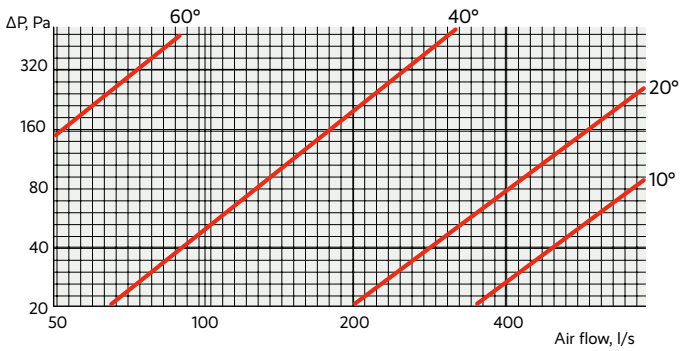
Pressure drop Ø160 airtight damper



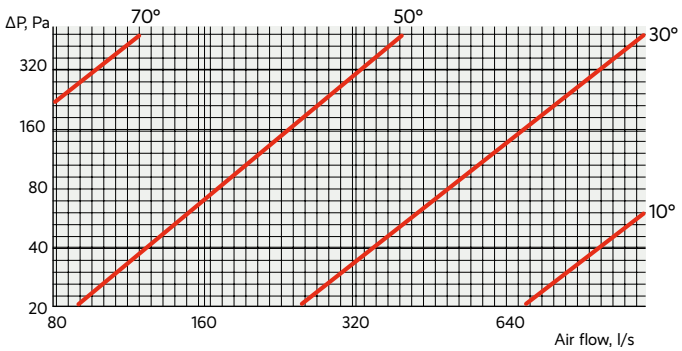
Pressure drop Ø200 airtight damper



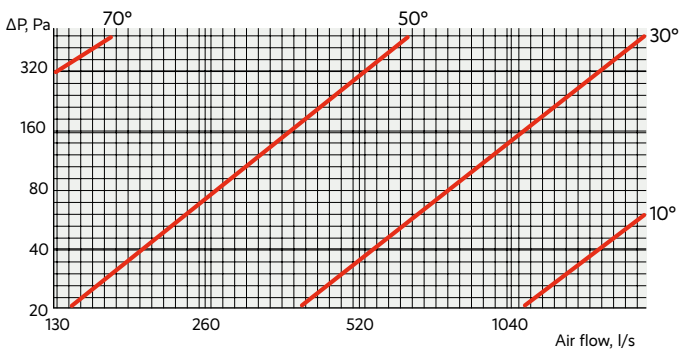
Pressure drop Ø250 airtight damper



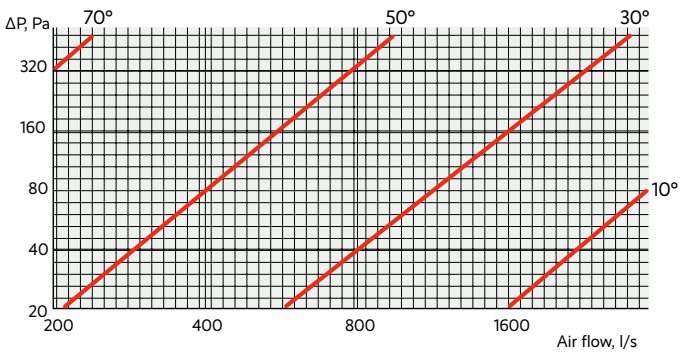
Pressure drop Ø315 airtight damper



Pressure drop Ø400 airtight damper



Pressure drop Ø500 airtight damper



Airflow = l/s
Pressure drop = Pa

Graphs for both manual and motorized can be 24V or 220V and must be modulating on a 0-10V signal.

6. DL533 – Specialist Data Centre Damper Class "B2"

Description

The DL533 range of heavy duty low leakage shut off dampers has been uniquely developed to meet the high standard requirements for the increasing demand in data centres. These dampers are made in sections up to 6m x 3m. The dampers typically have an insulated blade to prevent condensation and to add to the energy tightness of the building. They come with gusset plates for transportation and assembly purposes with linear or rotary drives in standard or inboard drives. The dampers are tested to EN 1751:2014 and achieved a class 2 blade leakage and class B casing leakage.

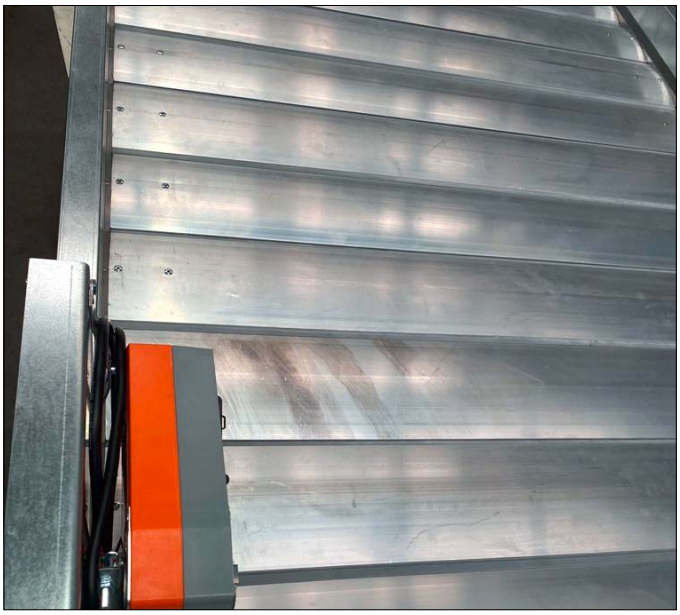
Large blade damper

Fully insulated blade up to 2,000 x 1,000mm single section and all fitted with gusset plates *(see drawing page 21)*.

Reinforced drive shaft and Oilite bearings

Stainless welded mesh pre-fitted.

Inboard motor driven



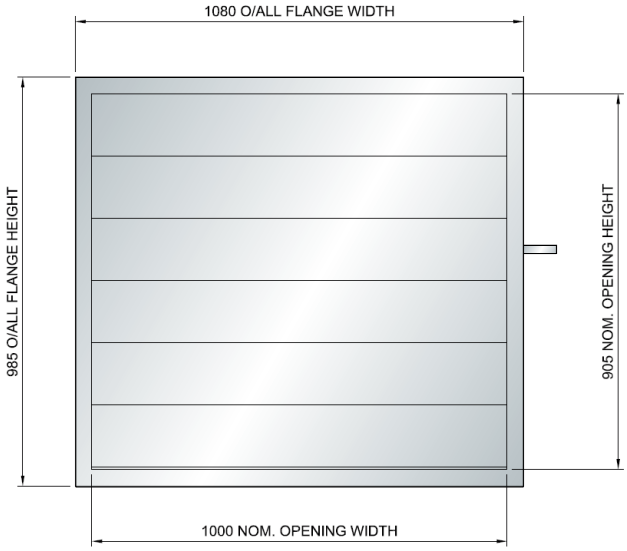
Results

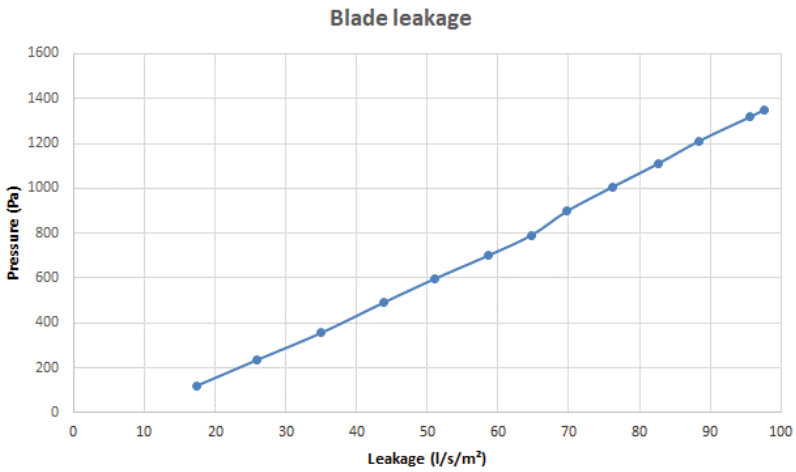
Blade leakage EN 1571

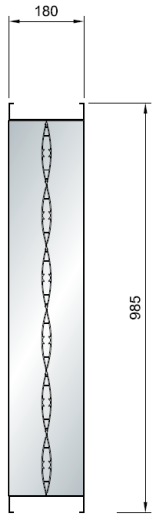
Actual flow rate (l/s)	Corrected flow rate (l/s/m²)	Static pressure (Pa)
15.80	17.44	120
23.40	25.83	233
31.75	35.05	356
39.70	43.82	490
46.30	51.11	597
53.10	58.62	700
58.60	64.69	790
63.20	69.76	898
69.10	76.28	1007
74.90	82.68	1110
80.10	88.42	1210
86.60	95.60	1317
88.50	97.69	1350

Note: the closed blade area is 0.9059m².

Sample Submitted







A trendline for the above graph would follow $y = 2.5636x^{1.3763}$

Note: Above related to manual external drive

Results rating: Class "2"

Specification

Frame	1.2mm galvanised steel frame, 180mm deep, 40mm flanges. welded & press fit fixings.
Blades	Aerofoil profile, single piece blade to run horizontally only. Thrust washers not fitted.
Material	6063-t6 extruded aluminium, 150mm pitch.
Bearings	Oilite bronze bushes.
Blade seals	Silicone rubber seals temperature range -40 to 130 °c. blade seals dovetail into port in blade.
Jamb seals	Stainless steel formed as to provide seal between the frame inside and the blade ends.
Linkage	BZP steel concealed in frame.
Axles	Rotary drive, rotary drive to have a solid hex shaped bar (13mm).
Case leakage	Class b
Blade leakage	Class 2

Notes:

1. Damper size controlled by a single actuator shall not exceed 2m².
2. Multiple section dampers will not be jack shafted.
3. Damper drive arrangement to be in-board rotary action to allow for the assembly of multiple sections.
4. 2mm thick joining plates to be provided to allow assembly of multiple sections and for use of fixing back to the wall.

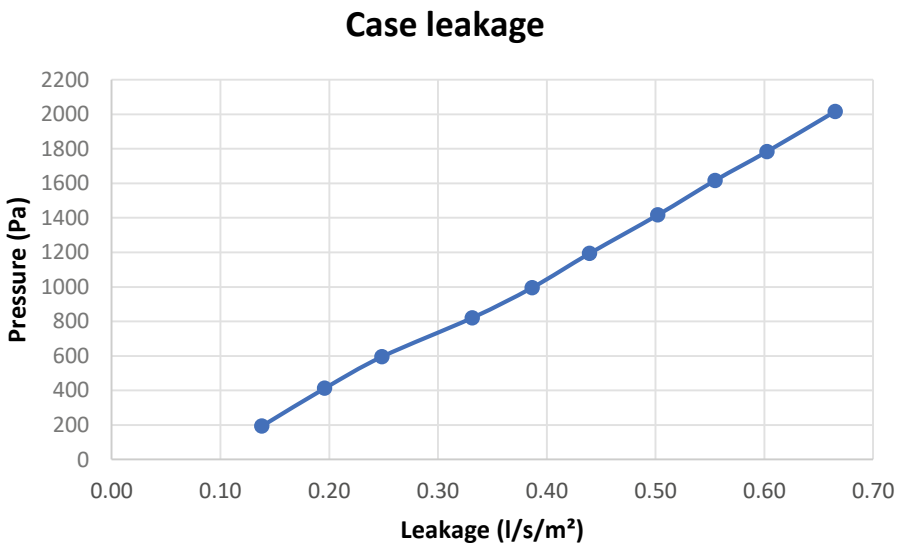
Case leakage EN 1571

As stated in Annex C of BS EN 1751: 2014, the reference casing area is taken as the perimeter of the damper multiplied by an equivalent length of 1m (the casing perimeter is 3.984m).

Actual flow rate (l/s)	Corrected flow rate (l/s/m²)	Static pressure (Pa)
0.55	0.14	194
0.78	0.20	413
0.99	0.25	596
1.32	0.33	821
1.54	0.39	996
1.75	0.44	1194
2.00	0.50	1417
2.21	0.55	1617
2.40	0.60	1784
2.65	0.67	2017

Case Leakage Class "B" Options Available:

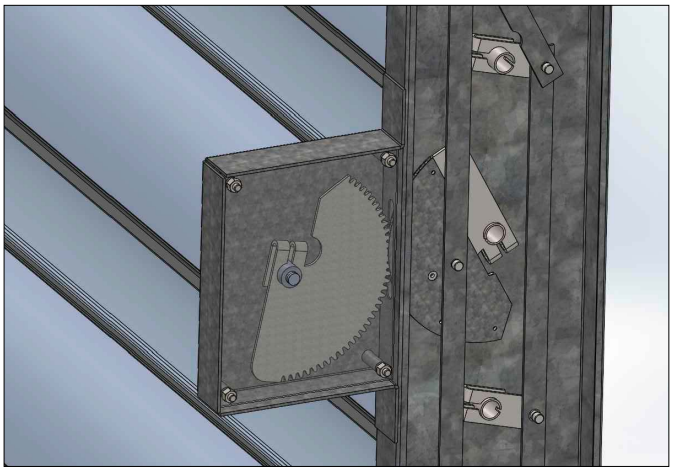
1. Insulated blades.
2. Stainless steel welded mesh.
3. Inboard motor drive.
4. Manual or motorized.
5. Steel blade or aluminium.
6. Opposed blade or parallel.
7. In multiple assembly of size required or single section to max available.
8. With or without joining strips and/or gusset plates.

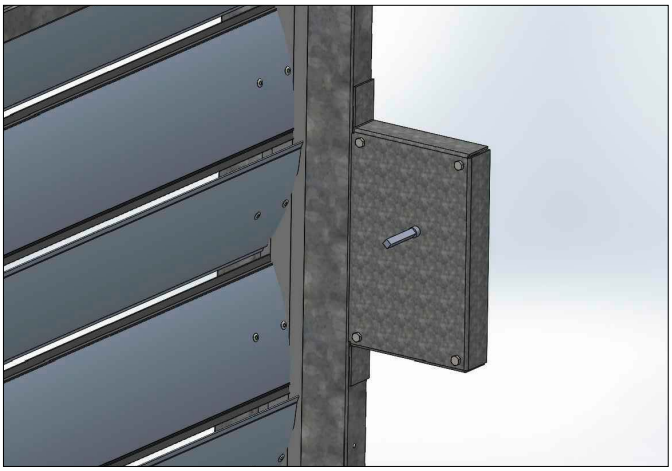


A trendline for the above graph would follow $y = 3782x^{1.4154}$

Results rating: Class ''B''

Inboard rotary drive mechanism



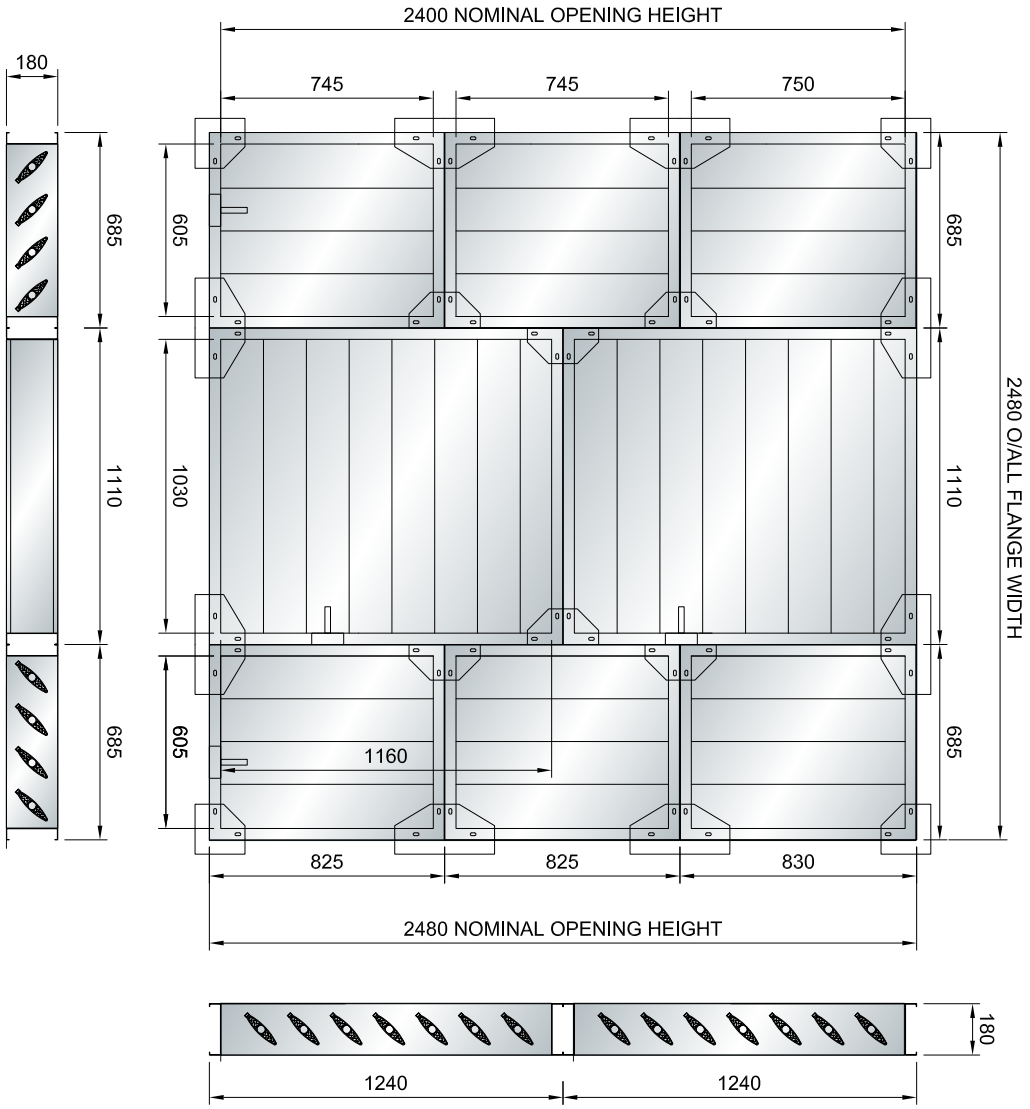


Conclusion

For blade leakage, the damper met the requirements of EN 1751:2014 Class 2.

For case leakage, the damper met the requirements of EN 1751:2014 Class B.

Typical Arrangement (Multi section - Multi directional)

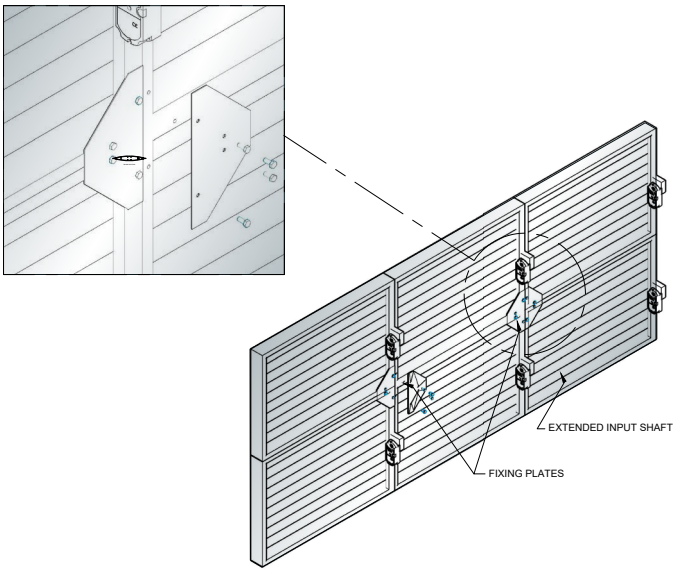


Specification

The DL533 damper opposite is required to be comprised of 8 sections (which could be made in less) with a single drive top 3 dampers, same at the bottom with the blades deflecting in opposite directions and the centre to dampers individually controlled with their opening remaining parallel.

The whole damper is constructed using 3mm gusset plates and blanking plates for joints to maintain the leakage certification.

Dampers are tested on the production line before they leave the factory which includes testing of motorized units.



7. uPVC Dampers

The Series LF uPVC-VCD is an exceptionally low leakage volume control damper, designed for use in highly energy efficient buildings and proven in independent tests to have a leakage over 70% below that currently required by Part L of Building Regulations.

The plastic construction:

- Serves to make the whole damper a thermal break, as opposed to some rival products which attempt to modify an existing metal VCD design using thermal breaks.
- Is corrosion resistant. Perfect for coastal areas, chlorinated atmospheres such as swimming baths, and anywhere dampers may be exposed to elevated moisture levels.

As with all HVC volume control dampers, the drive system is fully protected by being enclosed within the frame. This avoids it coming into contact with dust and debris which would adversely affect performance and warrant more frequent maintenance.

LF uPVC VCDs are now available with low pressure and high pressure specifications.

Design features

Material	Extruded rigid uPVC frame and blades Aluminium blade cores Stainless steel seals and fixings
Sizes	**Minimum:** 100mm x 105mm nominal. **Maximum single unit:** 1500mm width, 1005mm height or 1005mm diameter. Above any of these, units would be made in sections or with mullions.
Frame	40mm flanges 130mm overall depth
Finish	**Standard:** White uPVC **Optional:** Painted to any RAL or BS colour
Operation	Opposed blade, gear driven
Controls	Extended spindle for motorisation by others **Optional:** Locking quadrant Factory fitted electronic, pneumatic or ATEX rated actuators Please see pages 5 - 7 for more information on controls
Mass/m² face area	17.5 kg
Free Area	75% maximum

Typical installations:

1. Swimming Pool
2. Exposed or roof mounted
3. Coastal projects
4. Marine industry
5. Corrosive atmosphere
6. Thermal bridge free application
7. High humidity installation
8. Battery room extract system
9. Water treatment works
10. School laboratories or chemical extract hoods

Product testing

Leakage testing

Series LF uPVC VCDs have been tested for air-tightness when fully closed.

Part L of Building Regulations defines the maximum air permeability of a building as 10 m³/hr/m² when measured at 50 Pa.

The test damper was of nominal size 1000mm x 1005mm.

Test report number G2619/7610

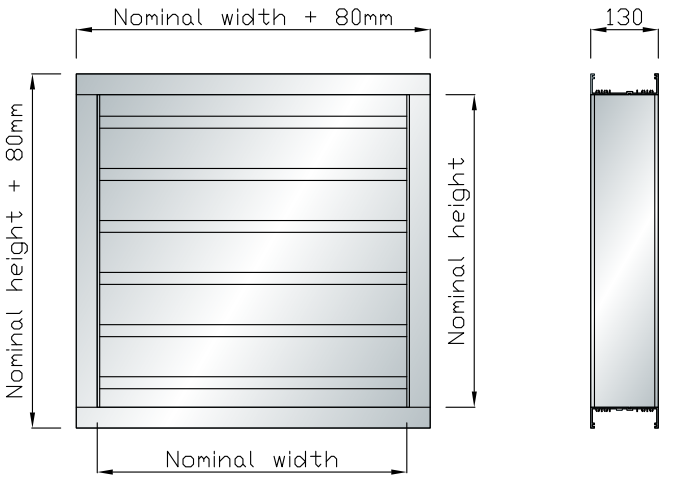
The testing was carried out in July 2015 by Building Testing Ltd in Surrey, England.

Copies of the test report are available on request.

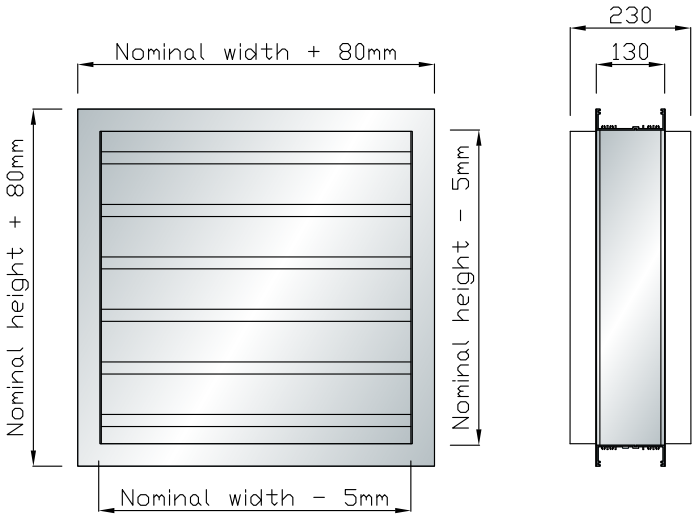
Air leakage				
Static pressure (Pa)	Low pressure specification		High pressure specification	
	l/s	m³/hr/m²	l/s	m³/hr/m²
25	0.40	1.43	–	–
50	0.77	2.76	–	–
75	1.00	3.58	–	–
100	1.17	4.19	–	–
150	–	–	1.47	5.26
200	–	–	1.73	6.19
250	–	–	1.81	6.49
500	–	–	3.07	11.00
750	–	–	4.27	15.29
1000	–	–	5.49	19.66
1250	–	–	6.35	22.75
1500	–	–	7.22	25.86
1750	–	–	8.24	29.51
2000	–	–	9.11	32.64

Technical drawings

Model A: Square flanged



Model B: Square spigotted



8. Variable Air Volume Dampers

Variable air volume damper in round and rectangular – standard or sound insulated

- Air volume regulation damper.
- Suitable for the control of air volume flow rate, room pressure or duct pressure.
- Available circular dimensions: Ø100-630 mm.
- Available rectangular dimensions: 200×100 to 1000×1000 mm. Size step: 100 mm.
- Effective flow measurement design to ensure highest precision of readings.
- Lowest volumetric flow deviations at all flow rates.
- Damper tightness class 3 according to EN 1751.
- Tightness class C according to EN 1751.
- Suitable for installation in places with limited straight duct section availability before the damper.
- In-factory presetting of the controllers.
- Can be supplied with actuators that have analogue, MP-bus, Modbus, BACnet and KNX communication.
- Simple adjustment of settings with ZTH or PC tool.
- An insulated model is available for sound attenuation through the case.

Circular air volume regulation damper KOS-C

Rectangular air volume regulation damper KOS-R

KOS-C and KOS-R is an air flow regulator for variable air volume (VAV) regulation in duct systems. Regulator consists of damper, measuring unit and controller. Damper is fitted with a differential pressure sensor for measuring the volume flow rate. The flow regulation can be controlled from room controller or BMS system.

The KOS-C VAV damper has a unique solution. The measuring pressure tubes inside of the damper are made of a unique shape that provides the best results and can provide accurate flow measurement also on a lower air flow speeds according to the study and research made. The high accuracy of the dampers can provide measurement deviation that does not exceed 10%.

We guarantee a stable and accurate result at a linear speed of 0.8 m/s. However, the damper also operates efficiently at lower speeds, but with a greater measurement deviation.

The damper controller can provide the variable air flow mode where the air flow is regulated in between the values Vmin and Vmax. Also the damper controller can provide a mode where air flow is kept constant using parameters Vmin, Vmax, Open or Closed. The damper can work as a room or duct pressure regulator where volumetric flows are regulated in a range between Vmin and Vmax depending on the function of supply air which can be controlled with room or other controller.

The setpoints for Vmin and Vmax are preset in factory but can also be readjusted afterwards. Easy adjustments of VAV damper operating values can be made with ZTH service tool and adjustment tool app.

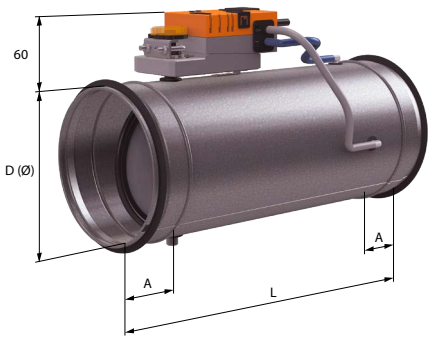
Appropriate air filters must be installed where high air dust pollution is possible as the contamination can negatively impact measurement accuracy.

Size and dimensions

KOS-C Damper

Circular dampers KOS-C available in 10 dimensions: ∅ 100–630mm

KOS-C Damper					
Size and dimensions			V *(m³/h)*		A *(mm)*
D	**L**	**L_1**	**min**	**max**	
100	390	312	23	283	45
125	390	312	35	442	45
160	390	312	58	724	45
200	390	312	90	1131	45
250	592	514	141	1767	45
315	592	514	224	2806	45
355	600	530	482	4275	45
400	600	530	615	6047	45
500	750	680	973	9484	45
630	800	780	1435	12482	45

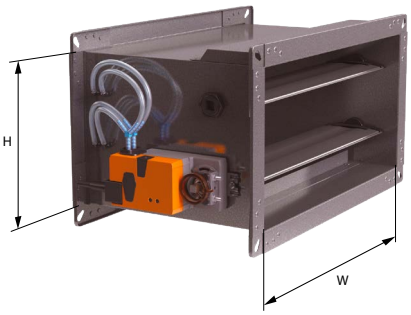


KOS-R Damper

Available dimensions of rectangular dampers KOS-R: from 200×100 to 1000×1000.

KOS-R Damper			
Size and dimensions		V *(m³/h)*	
H	**W**	**min**	**max**
100	200	130	720
	300	190	1080
	400	255	1440
200	200	255	1440
	300	380	2160
	400	505	2880
	500	630	3600
	600	755	4320
300	300	270	3240
	400	755	4320
	500	670	5400
	600	1130	6480
	700	1320	7560
	800	1505	8640
	900	1695	9720
	1000	1880	10800
400	400	1005	5760
	500	1255	7200
	600	1505	8640
	700	1755	10080
	800	2005	11520
	900	2260	12960
	1000	2510	14400

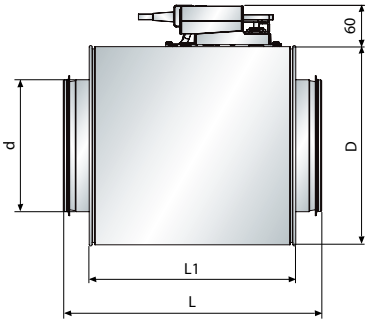
KOS-R Damper			
Size and dimensions		V *(m³/h)*	
H	**W**	**min**	**max**
500	500	1566	9000
	600	1879	10800
	700	2195	12600
	800	2510	14400
	900	2820	16200
	1000	**3135**	**18000**
600	600	2260	12960
	700	2631	15120
	800	3007	17280
	900	3385	19440
	1000	3760	21600
700	**700**	**3070**	**17640**
	800	3510	20160
	900	3950	22680
	1000	4385	25200
800	800	4010	23040
	900	4515	25920
	1000	**5015**	**28800**
900	900	5075	29160
	1000	5640	32400
1000	1000	6265	36000

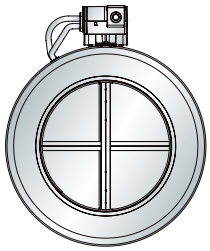


KOS-C-I Damper

An insulated damper version KOS-C-I is available to reduce the possible radiated noise through the case. The insulation is made from 50 mm thick mineral wool ISOVER KT-40 that is covered with a metal sheet made from zinc coated galvanized steel. ISOVER KT-40 fire resistance is classified as A1 in accordance with EN 13501.

KOS-C-I Damper					
Size and dimensions				V *(m³/h)*	
d	**D**	**L**	**L_1**	**min**	**max**
100	199	390	312	23	283
125	224	390	312	35	442
160	259	390	312	58	724
200	299	390	312	90	1131
250	349	592	514	141	1767
315	414	592	514	224	2806
355	453	600	530	482	4275
400	498	600	530	615	6047
500	598	750	680	973	9484
630	728	800	780	1435	12482





There is an option to order the insulated version with outer casing made from stainless steel.

KOS-C-I has the following sound insulating capacity R, dBA for required frequency:

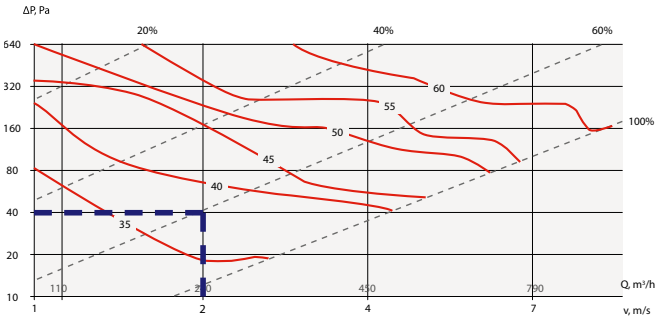
KOS-C-I Damper Sound Insulating Capacity								
Frequency *(Hz)*	63	125	250	500	1000	2000	4000	8000
R *(dBA)*	7	7	14	21	25	28	28	25

Pressure drop diagram example

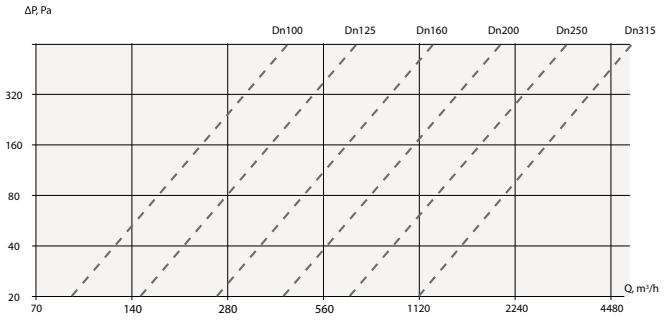
Pressure drop diagram indicates total pressure drop over the KOS-C damper as a function of air flow Q and the blade angle (100% as totally open blade).

Example: for KOS-C 200 damper with airflow Q = 240 m3/h and blade position 60%, total pressure drop ΔP = 40 Pa (see picture below).

Ø200 A – weightened sound power level L_{wa}, dB

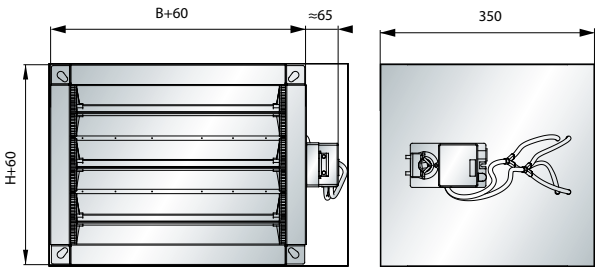


Pressure drop on open VAV damper



KOS-R-I Damper

KOS-R Damper			
Size and dimensions		**V (m³/h)**	
H	**B**	**min**	**max**
100	200	130	720
	300	190	1080
	400	255	1440
200	200	255	1440
	300	380	2160
	400	505	2880
	500	630	3600
	600	755	4320
300	300	270	3240
	400	755	4320
	500	670	5400
	600	1130	6480
	700	1320	7560
	800	1505	8640
	900	1695	9720
	1000	1880	10800
400	400	1005	5760
	500	1255	7200
	600	1505	8640
	700	1755	10080
	800	2005	11520
	900	2260	12960
	1000	2510	14400
500	500	1566	9000
	600	1879	10800
	700	2195	12600
	800	2510	14400
	900	2820	16200
	1000	**3135**	**18000**
600	600	2260	12960
	700	2631	15120
	800	3007	17280
	900	3385	19440
	1000	3760	21600



KOS-R Damper			
Size and dimensions		**V (m³/h)**	
H	**B**	**min**	**max**
700	**700**	**3070**	**17640**
	800	3510	20160
	900	3950	22680
	1000	4385	25200
800	800	4010	23040
	900	4515	25920
	1000	**5015**	**28800**
900	900	5075	29160
	1000	5640	32400
1000	1000	6265	36000

KOS-R-I has the following sound reduction (R) in dBA to meet required sound levels:

KOS-C-I Damper Sound Insulating Capacity								
Frequency (Hz)	63	125	250	500	1000	2000	4000	8000
R (dBA)	7	7	14	21	25	28	28	25

Optional controls

Modbus or BACnet connection

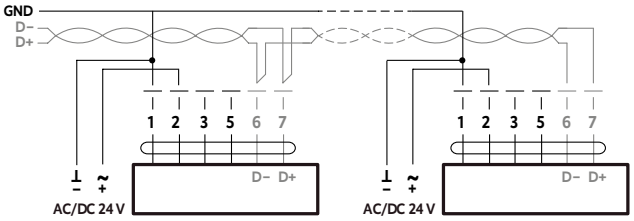
The Modbus protocol is used to establish master-slave / client-server communication between intelligent devices.

Using Modbus, a master (e.g. automation station) and several slaves can be interconnected. Below is a connection scheme for Modbus type actuators.

Type	Torque	Power consumption	Rating	Weight
LMV-D3-MOD	5 Nm	5 W	3.5 VA (max. 8 A @ 5 ms)	Approx. 500 g

Electrical installation

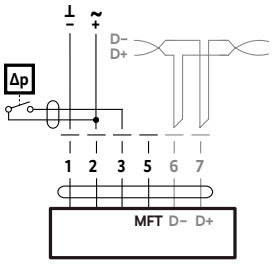
BACnet MS/TP / Modbus RTU



Cable colours:
1= black
2 = red
3 = white
5 = orange
6 = pink
7 = gray

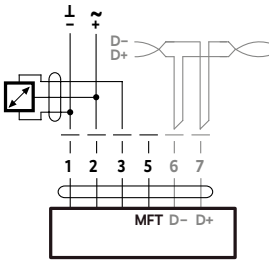
Signal assignement Modbus:
C_1 = D– = A
C_2 = D+ = B

Connection with switching contact, e.g. Δp-monitor



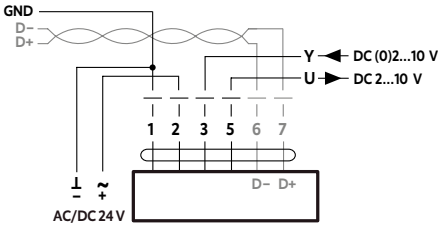
Switching contact requirements:
The switching contact must be able to switch a current of 16 mA at 24V accurately.

Connection of active sensors, e.g. 0...10 V @ 0...50°C

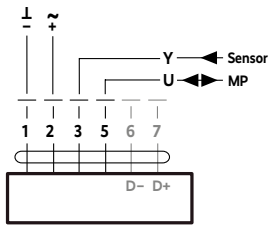


Possible voltage range:
0 ... 32 V (resolution 30 mV)

BACnet MS/TP / Modbus RTU with analog setpoint (hybrid mode)



Operating on the MP-Bus



Control systems

VAV dampers with Bus connection

Intelligent simplicity

- System connection to DDC controller with MP interface via MP-Bus®
- Integration in higher-level systems such as LONWORKS®, Konnex, Ethernet TCP/IP, Profibus DP, Modbus RTU etc. via MP gateway
- Convenient, cost-efficient wiring
- Maximum flexibility in new, retrofitted, converted or renovated buildings

Pressure drop and sound power level

KOS-C pressure drop and sound power level diagrams

The diagrams provide an A-weightened sound power levels that KOS-C damper emits in duct, L_{wa}. Correction factors K are provided to find emitted sound power level at the conformable frequency. Emitted sound L_W should be calculated as: $L_W = L_{wa} + K$.

Example: for KOS-C-125 damper with airflow Q = 90 m³/h and project pressure drop ΔP = 60 Pa, A-weightened sound power level is calculated as 42 dB(A).

To find emitted sound power level at 250 Hz, correction factor given in Table 1 should be used for Ø125, so $L_W = 42 + 3 = 45$ dB(A).

Diagram 1: Ø100 A – weightened sound power level Lwa, dB

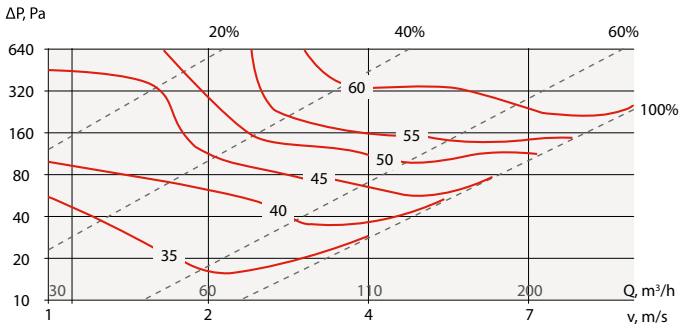


Diagram 2: Ø125 A – weightened sound power level Lwa, dB

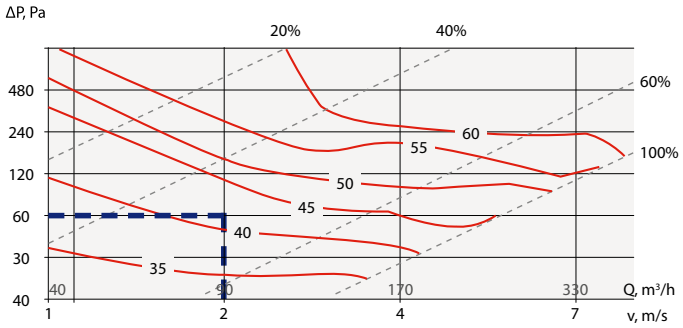


Diagram 3: Ø160 A – weightened sound power level Lwa, dB

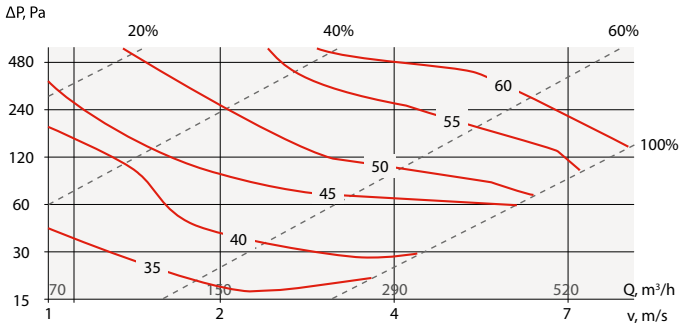


Diagram 4: Ø200 A – weightened sound power level Lwa, dB

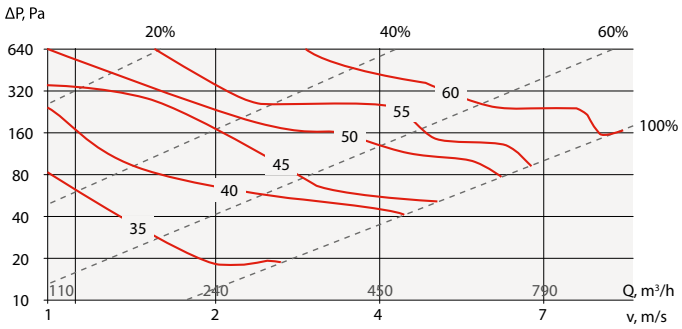


Diagram 5: Ø250 A – weightened sound power level Lwa, dB

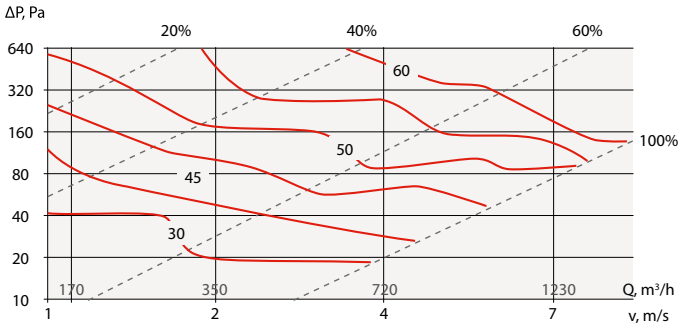
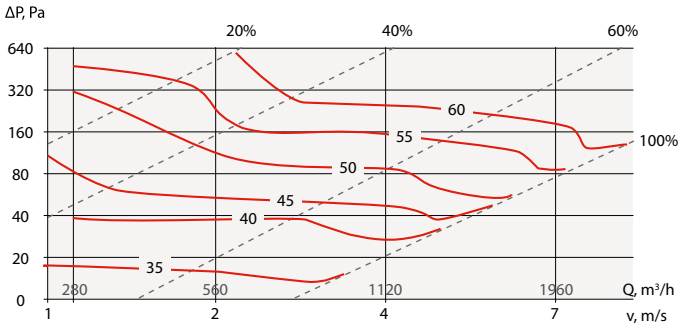


Diagram 6: Ø315 A – weightened sound power level Lwa, dB



Other diameter sizes available on request.

9. Pressure Relief Dampers

Product data

Items: Single-way pressure relief vent designed for use with pressurisation systems in stairwell escape routes (BS EN 12101-6) and other industrial applications (available in fire rated or standard).

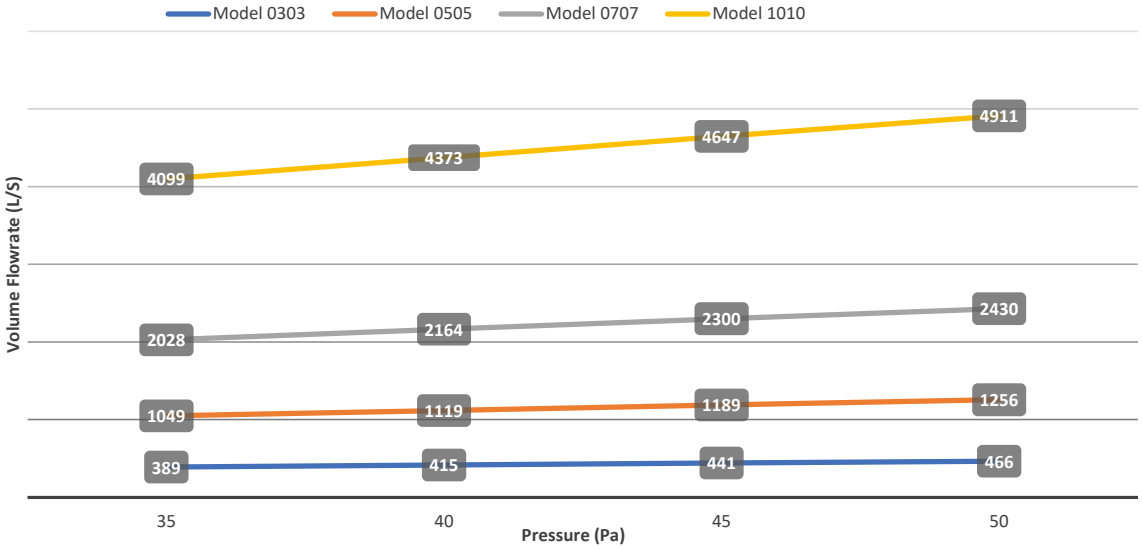
Standard Materials: Carbon steel frame and blades (stainless steel as an option) with stainless steel blade weights.

Standard Finish: White RAL 9010 powder coated. LUL Approved paint. Customer specific colours on request.

Pressure Setting: Setting Range: 35 to 50Pa (Default setting of 50Pa from factory with on-site adjustment).

Warranty: 10 Year.

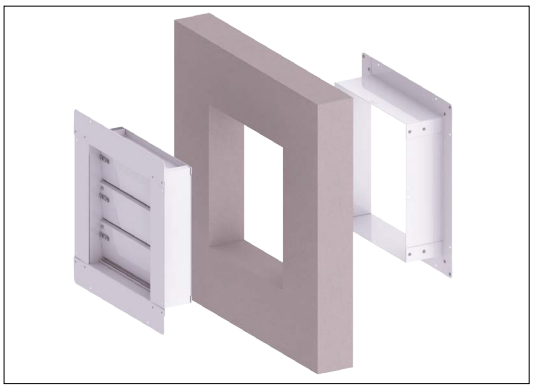
Volume Flowrates in L/S



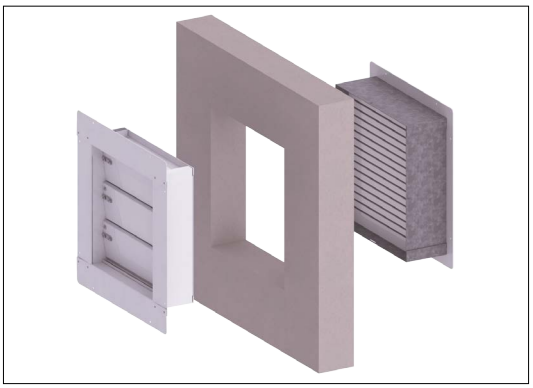
Dimensional data

Model No.	Over flange size *(W × H mm)*	Installation hole size *(W × H mm)*	Indicative weight (Vent + Wall Liner)
PRV-F2-0303	440 × 452	360 × 370	9.0 kg
PRV-F2-0505	640 × 652	560 × 570	17.0 kg
PRV-F2-0707	840 × 852	760 × 770	29.0 kg
PRV-F2-1010	1140 × 1152	1060 × 1070	51.0 kg

Typical Internal Wall Installation



Typical External Wall Installation



About

The PRV-F2 pressure relief vent has been designed to be fitted vertically into walls, or partitions of a building requiring pressure relief. Typical application would be pressurised stairwells in tall buildings.

Vent orientation is indicated by the serial number sticker on the bottom lip of the vent, this sticker should remain in the protected area.

The vent should be installed where it will not be covered up or blocked either side of the installation.

The standard PRV-F2 pressure relief vent fits into a wall thickness of 125 to 205mm (internal) 200 to 220mm (external). Deeper walls can be accommodated with the wall liner extension sleeve(s). Narrow installation into partitions less than 125mm can be accommodated with the aid of the C-frame kit assembly.

Handling and Care

Whilst all possible care is taken to eliminate sharp edges and burrs, care should be taken during installation. A risk assessment should be carried out prior to installation.

Due to construction in steel the unit can be heavy; therefore the weight of the unit should be noted before installation.

Normal and site specific safe handling and lifting procedures should always be adopted. Care should be taken not to damage the unit in any way as this could reduce its performance in the event of a gaseous system discharge.

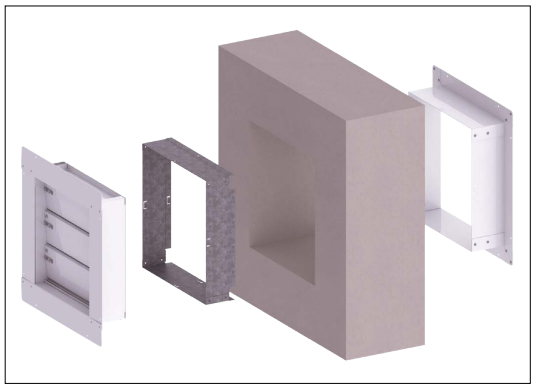
Technical Data

Model No.	Nominal size * *(W × H mm)*	Over flange size *(W × H mm)*	Aperture size *(W × H mm)*	Wall thickness ** *(mm)*
PRV-F2-0303	300 × 302	440 × 452	360 × 370	125 +
PRV-F2-0505	500 × 500	640 × 652	560 × 570	125 +
PRV-F2-0707	700 × 700	840 × 852	760 × 770	125 +
PRV-F2-1010	1000 × 1000	1140 × 1152	1060 × 1070	125 +

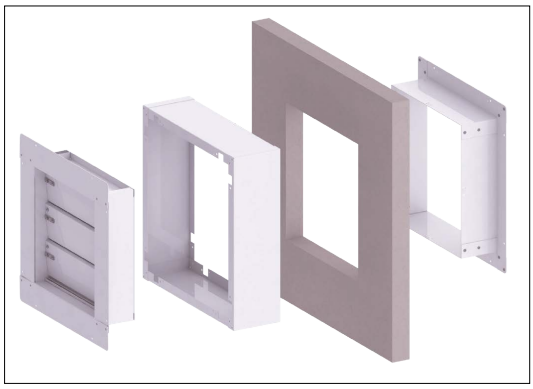
* Cover grille over flange dimensions are 10mm greater than the stated over flange size.

** For greater wall thickness, wall thickness extension sleeve(s) can be added. For thinner wall thickness a C-frame assembly can be added.

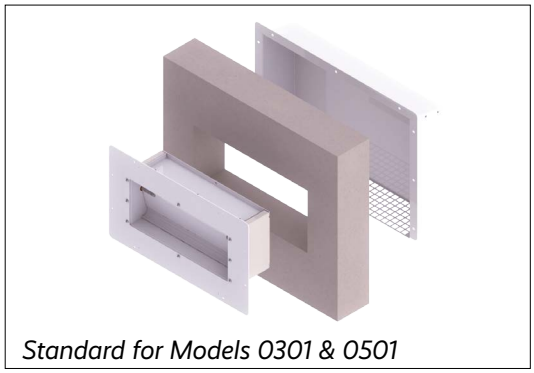
Typical Internal Deeper Wall Installation



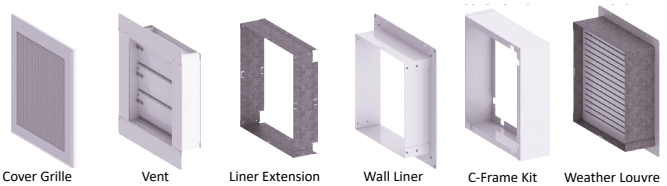
Typical Internal Narrow Wall Installation



Typical External Wall Installation with Cowl



Standard for Models 0301 & 0501



Standard internal wall depth range is 125 to 205mm with an external wall depth range of 200 to 220mm on model sizes of 0303 upwards. Extension sleeves can be added in 75mm increments to accommodate deeper walls.

10. BDS – Back Draught Shutter

Description

The butterfly shutter type BDS is used to prevent the reverse of air-flow in circular duct systems.

Construction

The casing of the BDS has been constructed from galvanised steel. The blades are made of aluminium. The shaft and the spring are made of stainless steel. The butterfly shutter is fitted with a return spring, which closes the blades onto a sound absorbing ring. Nominal diameters correspond to those in DIN 24145. For production range and main dimensions see the tables.

Installation

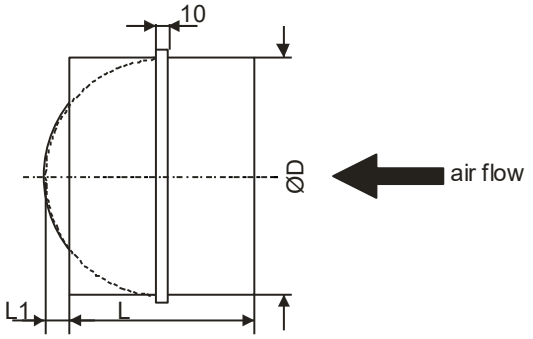
It is recommended to install the shutter into horizontal ducting. The shaft axis must be vertical. The shutter is installed into the duct by simple slide-in.

Operation conditions

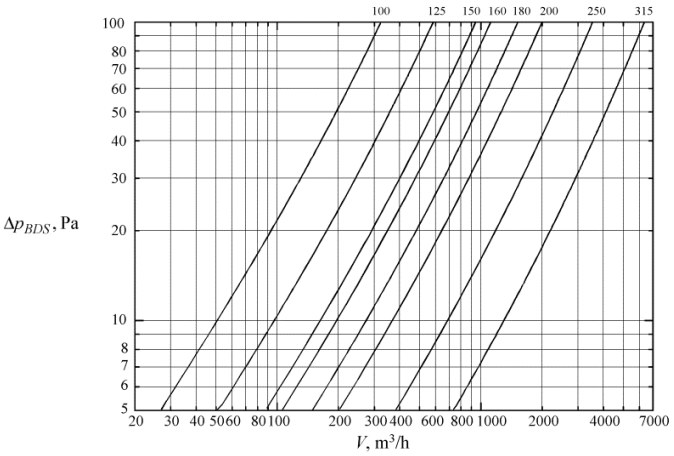
The shutter is designed for operation in a standard environment with ambient temperature up to 60°C, for transportation of clean air free of coarse dust, grease, chemical vapours and other impurities.

Dimensions

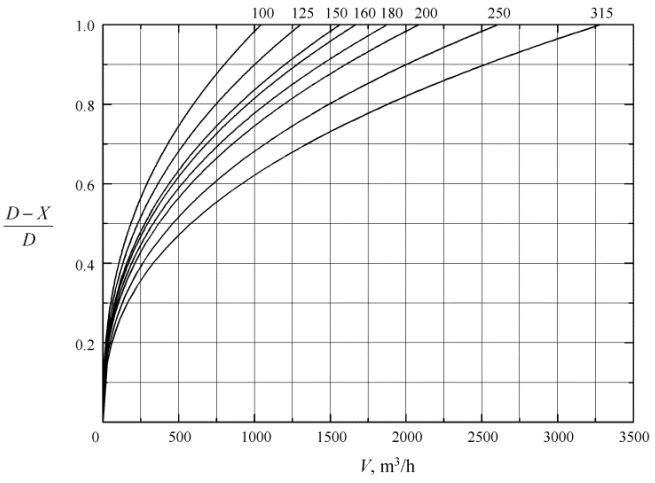
Type	∅ D (mm)	L (mm)	L1 (mm)	Case thickness (mm)	Average weight
BDS100	098.6 ± 0.4	88	6	0.55	0.13kg
BDS125	123.6 ± 0.4	88	19	0.55	0.17kg
BDS150	148.8 ± 0.4	88	31	0.55	0.22kg
BDS160	158.6 ± 0.4	88	36	0.55	0.24kg
BDS180	178.8 ± 0.4	88	46	0.55	0.26kg
BDS200	198.6 ± 0.4	88	56	0.55	0.29kg
BDS250	248.6 ± 0.6	128	61	0.8	0.68kg
BDS315	312.7 ± 0.6	128	94	0.8	0.81kg
BDS355	352.7 ± 0.6	198	65	0.8	1.47kg
BDS400	398.7 ± 0.6	198	94	0.8	1.68kg
BDS450	448.7 ± 0.6	248	80	0.8	2.43kg
BDS500	498.7 ± 0.6	248	107	0.8	2.76kg



Pressure loss



Opening of the butterfly blades as the function of air flow rate.



Fan Louvre Shutters

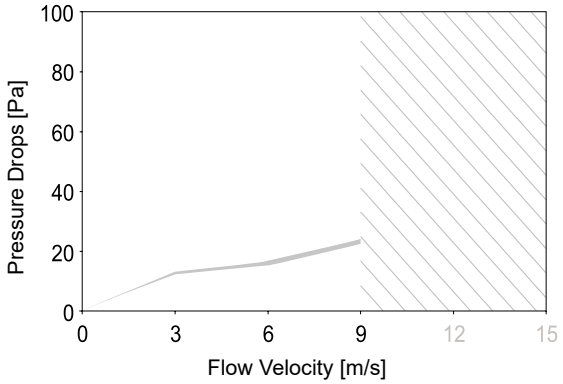
Automatic Version / Type WSK

- Plastic fan louvre shutter for exhaust ventilation
- Self-adjusting blades
- Outdoor weathering resistant (UV-stabilized)
- Suitable for an operating temperature range of -30°C to +60°C
- Maximum flow velocity 10 m/s for WSK 15 - 65
- Maximum flow velocity 15 m/s for WSK 90
- Opening angle 85°
- Specific design guarantees durability
- Manufactured of high standard ecologically friendly plastic
- Number of blades varies according to the size of the shutter
- WSK 55 – 65 divided by a middle strap
- WSK 70 – 85 divided into two parts
- From WSK 90 divided into three parts; supplied in three parts for self-assembly
- From WSK 70 all louvre shutters are equipped with an elongated hole to fasten it on the wall
- Available as special fabrication (WSK- S) in all sizes
- Models above WSK 65 are automatically fitted with steel wire supports.

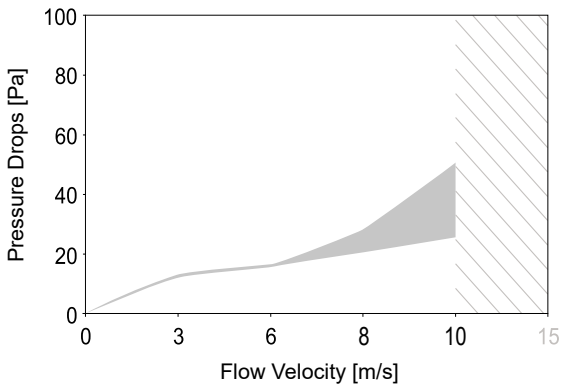
WSK 40

WSK 65

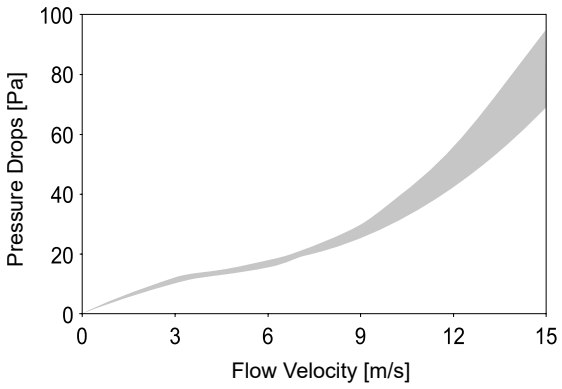
Pressure Drops WSK 10 – 12 / WSK S 16



Pressure Drops WSK 15 – 50



Pressure Drops WSK 55 – 110

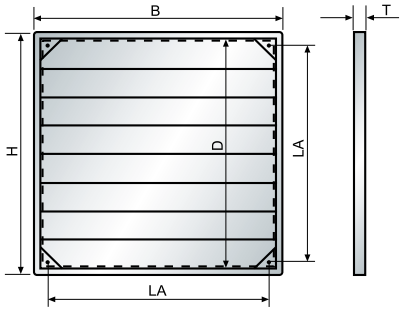


Note: Shutter can be made to any size required and additional 3mm steel pole can be inserted into blade and frame to withstand bad weather conditions and prevent blades from breaking free (model WSK - 65). Grey area relates to variations of back pressure depending on cross winds and pressure loss when opening the damper.

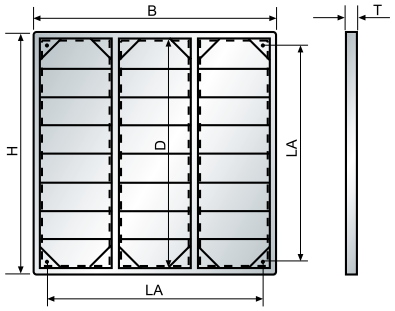
Fan Louvre Shutters

Automatic Version / Type WSK Square Shutters

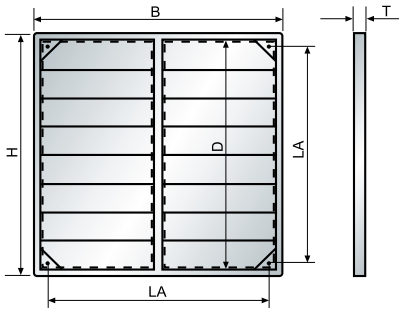
WSK 10 – 50



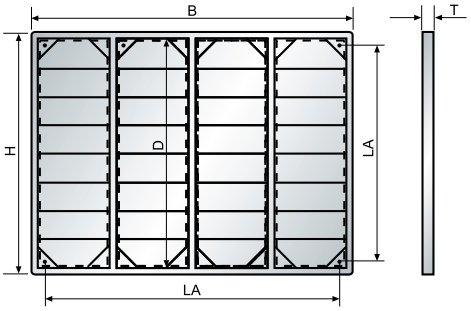
WSK 71 – 85



WSK 50 – 70



WSK 90 – 110



Type	Article No.		D2	H/B	LA	T	S	D2	Free cross-section *(cm²)*
	light grey	white							
WSK 10	-	20000000	93	123	90	12	13	98	66
WSK 12	20000011	20000012	129	160	110	15	-	-	127
WSK S 16	20000021	20000020	147	180	130	20	25	152	164

Type	Article No.	D	H/B	LA	T	Free cross-section *(cm²)*
	light grey					
WSK 15	20000031	159	195	140	22	196
WSK 20	20000041	210	243	182	21	336
WSK 25	20000051	258	294	232	26	507
WSK 30	20000061	310	346	276	26	732
WSK 35	20000071	360	397	310	26	987
WSK 40	20000081	422	462	366	26	1356
WSK 45	20000091	462	501	395	31	1942
WSK 50	20000101	505	548	443	31	1942
WSK 55*	20000111	563	603	520	28	3019
WSK 65*	20000121	655	696	628	31	3969
WSK 70**	20000201	700	740	670	40	4586
WSK 71**	20000203	720	760	690	40	4859
WSK 75**	20000205	750	790	720	40	5213
WSK 80**	20000207	800	870	772	40	6031
WSK 85**	20000209	850	890	822	40	6581
WSK 90***	20000211	900	940	872	40	6926
WSK 95***	20000213	950	990	922	40	8235
WSK 100***	20000215	1000	1040	972	40	9171
WSK 110***	20000305	1100	1140	1072	40	11159

Blades 40mm up to WSK 35.

Blades 85mm for WSK 40 and above.

Sizes indicated are constructed with 3mm steel wire to ensure blades do not break away for sizes WSK 65 and above.

* *middle support* ** *2 middle supports* *** *3 middle supports*

11. HD/BDD – Heavy Duty Back Draught Shutter

Back draught shutters are designed to permit air to flow in only one direction. This makes them useful for applications where a duct is only used at intervals, and needs to be shut down at other times in order to prevent heat loss or backflow.

Series BDS back draught shutters are manufactured from extruded aluminium throughout, ensuring an inherently high resistance to corrosion along with minimal weight.

Blades are supplied unlinked as standard, allowing them to open and close independently of each other. For larger units or where the application involves higher air velocities, blades can be linked. This has a damping effect, smoothing the blades' motion as they are opened and closed.

If required, blades can also have concealed weights fitted to allow the damper to be set up on site to open at a specific pressure.

Design features

Material	**Frame and blades:** Extruded aluminium **Drive system:** Acetyl as standard, brass and zinc if high temperature specification Galvanised steel spigot plates (if required) Felt blade edge seal (not fitted if high temperature specification is required)
Sizes	Minimum: 100mm × 100mm nominal Maximum single unit: 2900mm × 2900mm nominal Widths above 1200mm nominal size will use support mullions in the centre
Frame	40mm wide flange 100mm overall depth
Finish	Standard: Mill aluminium
Mass/m² face area	14 kg
Free area	86% maximum

Important note: This product in its standard configuration is only intended for use in a vertical orientation.

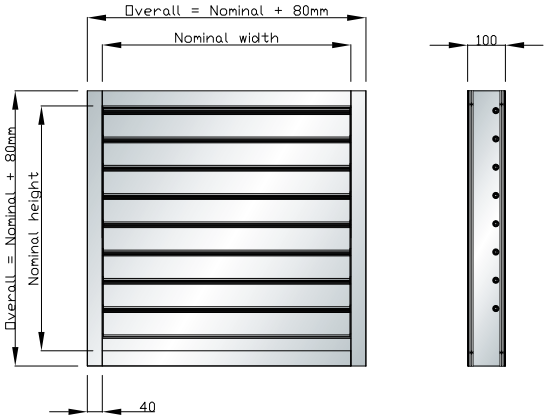
We can supply units suitable for a horizontal application (where normal airflow is upwards) but must be advised at ordering stage.

This product is unsuitable for use horizontally when normal airflow is downwards. Suitable for inside duct and end of duct mounting.

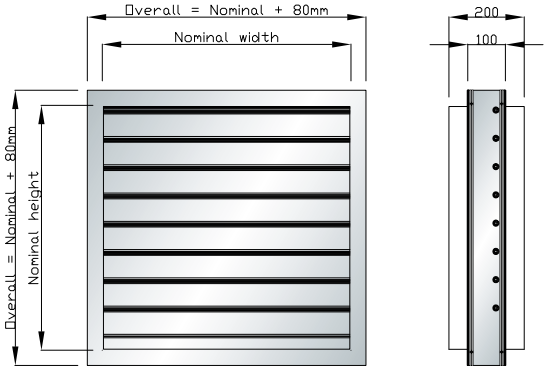
At higher velocities, above 5 m/s for example, we recommend the specification of linked blades for further strengthening.

Technical drawings

Model A: Square flanged (no case)



Model B: Square spigotted



Weighted Blades

The specification of weighted blades equips back draught shutters with linked blades, but also means removable steel weights will be fitted to the concealed linkage bar.

These weights increase the pressure required to open the damper, and can be removed or added to the linkage bar on site to adjust the point at which the damper opens.

AMS

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" You don't have to hold a position to be a leader. "
— Henry Ford