



Manufacturer & Stockist
of
Heating, Ventilation &
Air Movement Equipment

Units 2 & 3
Bull Ring Trading Estate,
Green Street, Digbeth,
Birmingham, B12 0NB.
Tel: 0121 766 8126
Fax: 0121 766 7239
www.ajs-vent.co.uk

VOLUME CONTROL / REGULATING DAMPERS

PRODUCT RANGE

Model Range Includes

- A - Multi-Leaf. (Flanged - Rectangular Duct)
- B - Multi-Leaf. (Slip joint / Spigot - Rectangular Duct)
- C - Multi-Leaf. (Slip joint / Spigot - Circular Duct)
- D - Single Blade. (Slip joint/Spigot - Circular Duct)
- E - Iris. (Slip joint / Spigot - Circular Duct)

Operation Options

- Manual – Plastic quick release hand control
- Manual – Zinc cast quadrant hand control.
- Motorised – 12mm Ø Zinc Cast Spindle.

Material Options

- Extruded Aluminium.
- Galvanised steel.
- Stainless steel.



Description / Full Features:

The AJS range of volume control dampers, have been designed specifically for ease of balancing airflow through ducting systems. The range offers suitability for both rectangular & spiral/circular ductwork systems.

- Flanged and spigot / slip joint installation connections.
- Manual hand control options with visual open/closed indication.
- Motorised operation control.

Certification

- BSRIA Quality approved pressure tested.

AJS are proud to be associated with:



Every effort is made to ensure the information in AJS literature is correct, however no warranty is given in this respect and the company shall not be liable as a result of any inaccuracy. The company has a policy of continuous product development and reserves the right to alter, at any time, specification without prior notice



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MULTI-LEAF VOLUME CONTROL DAMPER

PRODUCT RANGE

Model Range Includes

- A - Multi-Leaf. (Flanged - Rectangular Duct)
- B - Multi-Leaf. (Slip joint / Spigot - Rectangular Duct)
- C - Multi-Leaf. (Slip joint / Spigot - Circular Duct)

Operation Options

- Manual – Plastic quick release hand control
- Manual – Zinc cast quadrant hand control.
- Motorised – 12mm Ø Zinc Cast Spindle.
(Motors / actuators available on request)

Material

- Extruded Aluminium Casing.
- Extruded Aluminium Aerofoil Blades.

Certification

- BSRIA Quality approved pressure tested.



Description:

The AJS range of light weight extruded aluminium, multi-leaf volume control dampers are manufactured by us in the UK and have been designed specifically for ease of balancing airflow through ductwork systems. Our standard model operates via a single zinc cast spindle (specific to operation requirements) internally mounted to an internal (none visible gearing system), allowing a maximum rotation of 90° for the opposed aerofoil blades. The range offers both flanged and spigot / slip joint installation connections, a choice of manual hand control options with visual open/closed indication, (quick release plastic hand control or zinc cast quadrant hand control) and motorised operation control (12mm Ø Zinc cast extended spindle).

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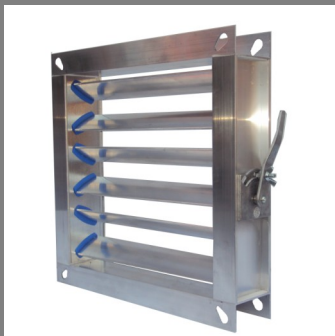
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FLANGED TYPE A MULTI-LEAF VOLUME CONTROL DAMPER

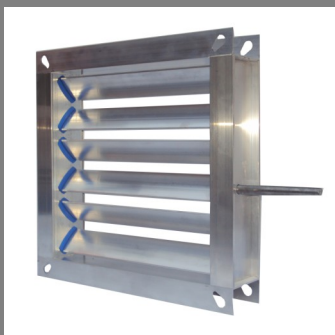
Drive Operation Options



Manual – Plastic quick release hand control



Manual – Zinc cast quadrant hand control.



Motorised – 12mm Ø Zinc Cast Spindle.
(Motors / actuators available on request)

Features:

Model: Type A - Multi-Leaf Volume Control Damper.

Duct Suitability: Rectangular & Square Ducts.

Duct Connection Type: Flanged

- 35mm Flange .
- Pre-pierced tear drop hole corners (suitable for most flanging systems)

Internal Drive System: None Visible Gear Driven Blade Operation.

- High Impact Polypropylene Injection Moulded Gears
 - Allows min 0° - max 90° rotation of the opposed aerofoil blades.
- 5 Point High Impact Polypropylene Injection Moulded Blade Insert.
 - 2 x Snap-Lock connection to Drive Gears.
 - 3 x Strength points inserted within the blade ends.
- Safe Edge Gear & Blade Mounting Plate.
 - Galvanised steel - Pressed up-form / rolled over gear & blade mounting system (offers a safe edge through-hole between blade & gear assembly), preventing metal to plastic abrasion / cutting.
- Internally Mounted Non Removable Zinc Cast Spindle.
 - Positive action Gear to drive operation.
 - Prevents unnecessary removal.
 - Dismantling the damper unit for removal is required.

Operation Options

- Manual – Plastic quick release hand control
- Manual – Zinc cast quadrant hand control.
- Motorised – 12mm Ø Zinc Cast Spindle. (Motors / actuators available on request)

Material

- Extruded Aluminium Casing.
- Extruded Aluminium Aerofoil Blades.

Dimensional Details

- 75mm Depth.
 - Min 100mm x 100mm - Max 1000mm x 1000mm
 - Multi assembled units available for ducts over 1000mm x 1000mm

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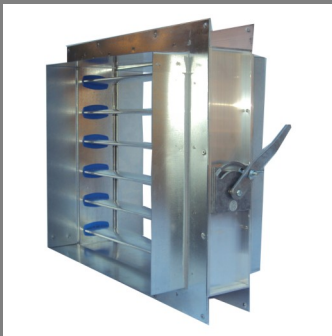
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FLANGED TYPE B MULTI-LEAF VOLUME CONTROL DAMPER

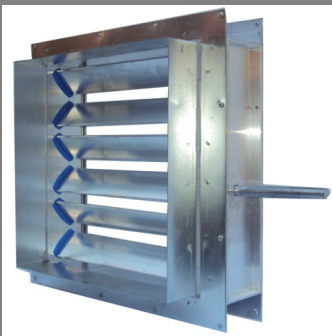
Drive Operation Options



Manual – Plastic quick release hand control



Manual – Zinc cast quadrant hand control.



Motorised – 12mm Ø Zinc Cast Spindle.
(Motors / actuators available on request)

Features:

Model: Type B - Multi-Leaf Volume Control Damper.

Duct Suitability: Rectangular & Square Ducts.

Duct Connection Type: Slip joint / Spigot

Internal Drive System: None Visible Gear Driven Blade Operation.

- High Impact Polypropylene Injection Moulded Gears
 - Allows min 0° - max 90° rotation of the opposed aerofoil blades.
- 5 Point High Impact Polypropylene Injection Moulded Blade Insert.
 - 2 x Snap-Lock connection to Drive Gears.
 - 3 x Strength points inserted within the blade ends.
- Safe Edge Gear & Blade Mounting Plate.
 - Galvanised steel - Pressed up-form / rolled over gear & blade mounting system (offers a safe edge through-hole between blade & gear assembly), preventing metal to plastic abrasion / cutting.
- Internally Mounted Non Removable Zinc Cast Spindle.
 - Positive action Gear to drive operation.
 - Prevents unnecessary removal.
 - Dismantling the damper unit for removal is required.

Operation Options

- Manual – Plastic quick release hand control
- Manual – Zinc cast quadrant hand control.
- Motorised – 12mm Ø Zinc Cast Spindle. (Motors / actuators available on request)

Material

- Extruded Aluminium Casing.
- Extruded Aluminium Aerofoil Blades.

Dimensional Details

- 75mm Depth.
 - Min 100mm x 100mm - Max 1000mm x 1000mm
 - Multi assembled units available for ducts over 1000mm x 1000mm

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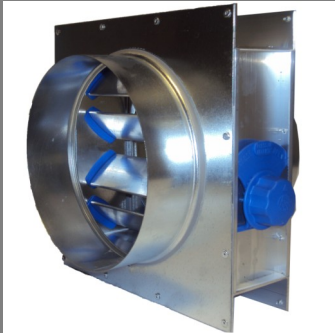


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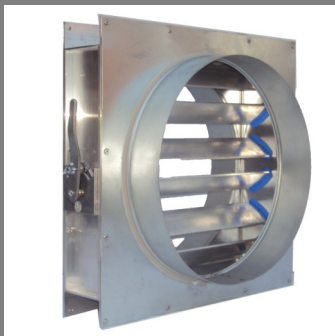
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FLANGED TYPE C MULTI-LEAF VOLUME CONTROL DAMPER

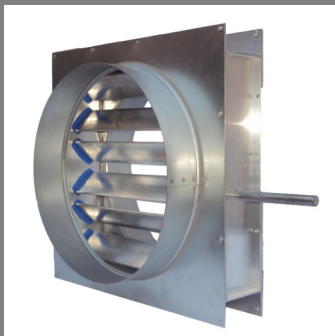
Drive Operation Options



Manual – Plastic quick release hand control



Manual – Zinc cast quadrant hand control.



Motorised – 12mm Ø Zinc Cast Spindle.
(Motors / actuators available on request)

Features:

Model: Type C - Multi-Leaf Volume Control Damper.

Duct Suitability: Spiral / Circular Duct.

Duct Connection Type: Slip joint / Spigot

Internal Drive System: None Visible Gear Driven Blade Operation.

- High Impact Polypropylene Injection Moulded Gears
 - Allows min 0° - max 90° rotation of the opposed aerofoil blades.
- 5 Point High Impact Polypropylene Injection Moulded Blade Insert.
 - 2 x Snap-Lock connection to Drive Gears.
 - 3 x Strength points inserted within the blade ends.
- Safe Edge Gear & Blade Mounting Plate.
 - Galvanised steel - Pressed up-form / rolled over gear & blade mounting system (offers a safe edge through-hole between blade & gear assembly), preventing metal to plastic abrasion / cutting.
- Internally Mounted Non Removable Zinc Cast Spindle.
 - Positive action Gear to drive operation.
 - Prevents unnecessary removal.
 - Dismantling the damper unit for removal is required.

Operation Options

- Manual – Plastic quick release hand control
- Manual – Zinc cast quadrant hand control.
- Motorised – 12mm Ø Zinc Cast Spindle. (Motors / actuators available on request)

Material

- Extruded Aluminium Casing.
- Extruded Aluminium Aerofoil Blades.

Dimensional Details

- 75mm Depth.
 - Min 80Ø - Max 1000Ø.
 - Multi assembled units available for ducts over 1000Ø.

FLAT OVAL DAMPERS AVAILABLE ON REQUEST.

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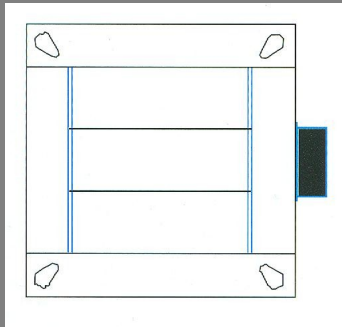


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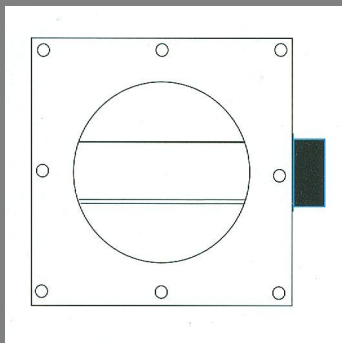
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FLANGED MULTI-LEAF VOLUME CONTROL DAMPER DIMENSION DETAILS

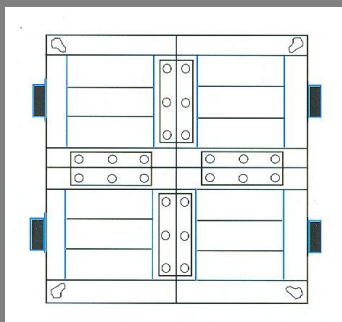
Diagram



Flange Connection
Maximum Single Unit Size 1000mm x 1000mm

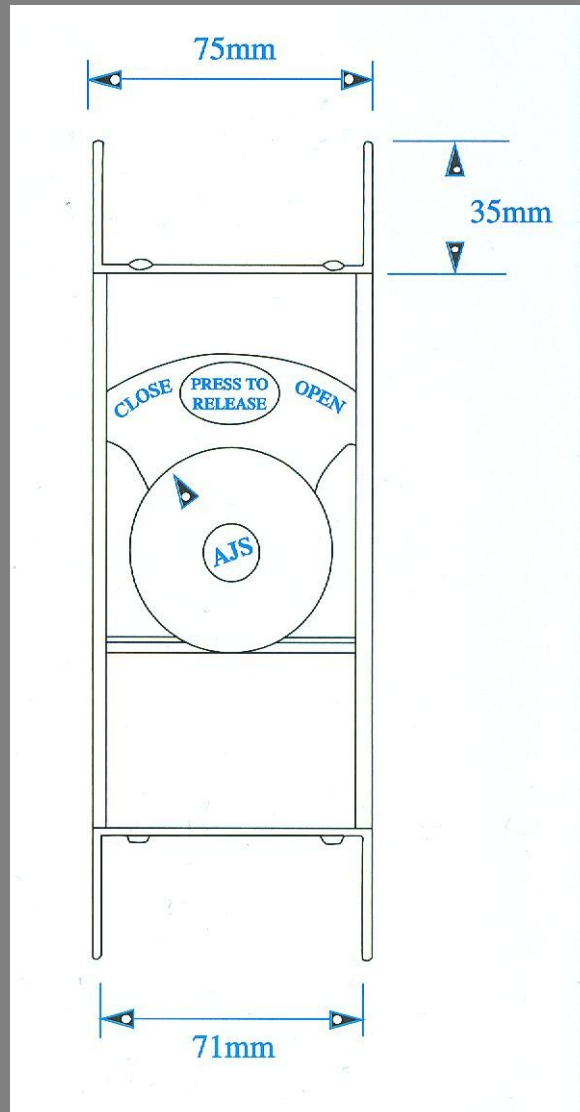


Spigot / Slip Joint Connection
Max Single Unit Size 1000mm Ø



Multi-Assembly Available for duct over
1000mm H, 1000mm W or 1000mm Ø

Typical Damper Dimensions



Materials

Aluminium.

- Min 0.8mm Aerofoil Blades
- Min 0.8mm Casing
- 3.2mm Aluminium Rivets

Galvanised Steel

- 0.8mm Blade & Gear Mounting.
- 0.8mm Slip Joint / Spigot.
- 1.2mm Joining Plates (Applies to multi-assembled units only).

Zinc Cast .

- Spindle (Standard).
- Quadrant Control (Optional).
- Motorised Spindle (Optional).

Zinc Plated Screws (As Standard)

- Stainless steel available on request.

High Impact Polypropylene.

- Gears (Gear Assembly)
- Blade End Inserts.
- Quick Release Manual Hand Control (Optional).

Emulsion Base Sealant.

- Slip Joint/Spigot Options Only.

1mm Closed Cell Polyethylene.

- Casing End Seals.

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MULTI-LEAF VOLUME CONTROL DAMPER BSRIA TEST REPORT DETAILS

Page 1



Report

www.bsria.co.uk

Testing of a multi-leaf volume control damper to determine the casing leakage

Report 17160/1
July 2002

Carried out for: A J Services
Unit 3
Expressway Industrial estate
Bracebridge Street
Aston
Birmingham, B6 4NE

Compiled by: C.H. Smith

No. of pages: ii of preamble
2 of text

Appendix: A (7 pages)

Quality Approved:


J. Cairns

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MULTI-LEAF VOLUME CONTROL DAMPER BSRIA TEST REPORT DETAILS

A J Services

Multi-blade volume control damper leakage

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4	COMMENTS ON TEST RESULTS	2
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APPENDICES

Appendix A Test result and Instrumentation

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MULTI-LEAF VOLUME CONTROL DAMPER BSRIA TEST REPORT DETAILS

Page 3

A J Services

Multi-blade volume control damper leakage

1 INTRODUCTION

The test work was carried out to determine the casing leakage of a multi-leaf rectangular air volume control damper. Testing was carried out generally in accordance with BS EN 1751:1999 "Ventilation for buildings - Air terminal devices - Aerodynamic testing of dampers and valves."

The damper was supplied by and tested on behalf of:

A J Services
Unit 3, Expressway Industrial Estate
Bracebridge Street
Aston
Birmingham
B6 4NE

Testing took place at BSRIA's Crowthorne laboratory during the 10th and 11th May 2002.

This report refers only to the damper described in the main body of the report and to no other manufactured by the above company.

2 DESCRIPTION

The sample submitted for testing was a multi-leaf rectangular air volume control damper manufactured in aluminium. The unit was assembled in such a way as to enclose the blade bearings within the structure of the frame. The only bearing shaft to penetrate outside the frame was connected to the control handle, which had a self-locking mechanism. The aerofoil blades were connected together internally and linked to the control handle via a single shaft.

The test sample had internal dimensions of 300 mm high by 300 mm wide by 75 mm deep with six 50 mm deep aerofoil damper blades.

The damper sample was:-

- AJS Multi-Leaf Volume Control Damper: 300 mm x 300 mm x 75 mm with 6 aerofoil blades

3 TESTING

Testing was carried out using the test methodology described in BS EN 1751:1999 "Ventilation for buildings - Air terminal devices - Aerodynamic testing of dampers and valves." Only the procedure described in section 5.3 "Casing Leakage" was applied to the test sample.

Testing was carried out on the damper by fitting blanking plates to either side with a supply air connector and static pressure tapping on one side. Air was supplied to the damper from a high pressure fan via an airflow measuring device. The damper was subjected to a range of pressures up to 2300 pascals, and the supply airflow rate was noted against each pressure. Several tests were carried out to determine by elimination the leakage rate for different components of the damper. The damper itself has two areas where leakage can take place, there are the four corner seals of the frame, and where the drive shaft is connected to the control handle. There is also another area of leakage, which is the test rig itself. As very small airflow rates are involved it is almost impossible to have a leak free system, so a rig calibration test was conducted to establish the leakage rate from the test rig. The results from this test were then subtracted from the other test results so that the true frame leakage can be established. The results of all the tests can be found in Appendix A.

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MULTI-LEAF VOLUME CONTROL DAMPER BSRIA TEST REPORT DETAILS

4 COMMENTS ON TEST RESULTS

The results for tests 1, 2 and 3 are shown in appendix A, and from these results Table 4 has been generated, correcting the leakage to take into account the test rig losses, also shown is a break down of the leakage for the frame and the control handle. As can be seen from the results the highest area of leakage is the control handle, which is 82% of the total. Also shown in Table 4 is the calculated leakage rate per square metre of the whole assembly and the frame for comparison with the leakage classifications A, B, & C in accordance with the standard. As can be seen, the frame leakage component is close to class C, however adding to it the control handle leakage, changes it to a class A.

Looking at the construction of the test sample assembly, it could be seen that the areas of leakage will be the same for units of a different size with a single control handle assuming that the width will always be 75 mm. Based on this information from the test results Table 5 has been generated by calculating the leakage rate per area for different sizes of damper. As can be seen from the calculations small units will only meet class A whereas large units will probably meet class C at low pressures.

5 RESULTS

SUMMARY OF TEST RESULTS		
Test pressure (Pa)	Frame leakage (l/s)	Control handle leakage (l/s)
200	0.004	0.018
1000	0.020	0.090
2000	0.040	0.180

Leakage rates corrected to standard conditions of 20°C and 1013.25 mbar.

Individual test results can be found in Appendix A: Tables 1 to 3.

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MULTI-LEAF VOLUME CONTROL DAMPER BSRIA TEST REPORT DETAILS

APPENDIX A

Test results and Instrumentation

Total No. of pages: 7

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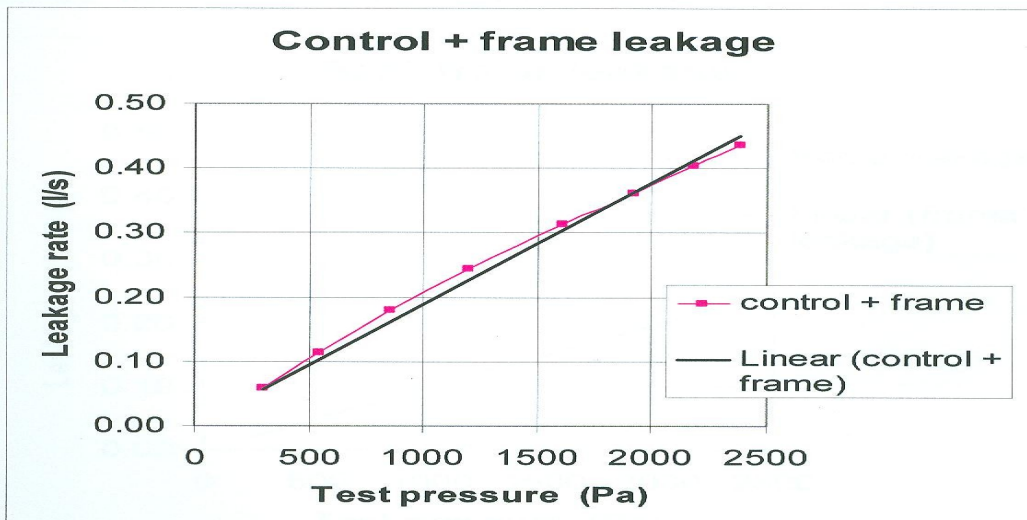
MULTI-LEAF VOLUME CONTROL DAMPER BSRIA TEST REPORT DETAILS

Table 1: Test 1. Frame leakage test on frame joints both sides and control handle

Test 1
Frame size:300 x 300 x 75 mm

test pressure Pa	measured leakage l/s
304.5	0.0593
548.0	0.1136
852.2	0.1801
1202.1	0.2435
1611.5	0.3134
1921.4	0.3616
2183.0	0.4033
2385.0	0.4355

Graph 1: Test 1. Frame leakage test on frame joints both sides and control handle



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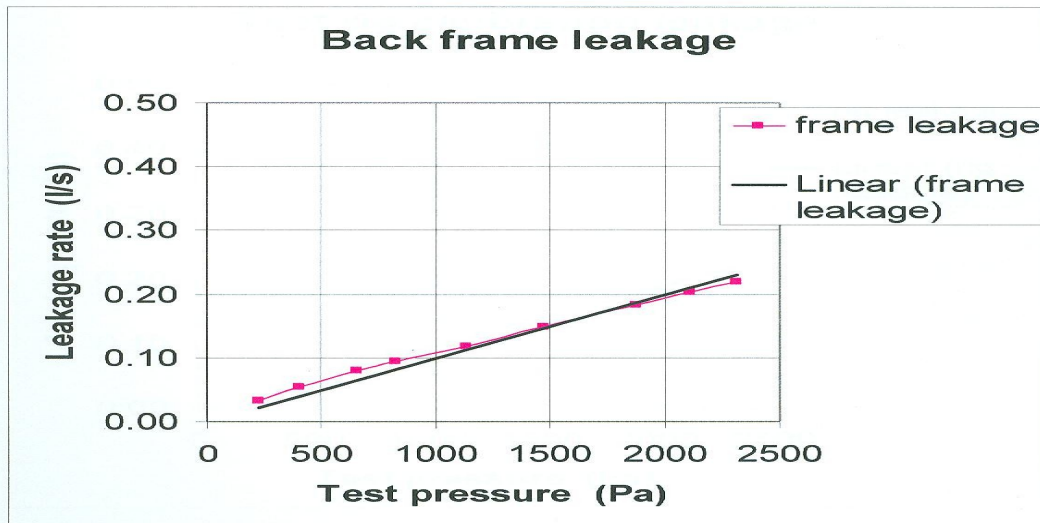
Multi-blade volume control damper leakage

Table 2: Test 2. Frame leakage test on back frame joints only

Test 2
Frame size: 300 x 300 x 75 mm

test pressure Pa	measured leakage l/s
227.8	0.0335
404.0	0.0543
654.0	0.0797
822.5	0.0939
1140.0	0.1178
1471.0	0.1494
1873.6	0.1832
2112.9	0.2035
2314.0	0.2200

Graph 2: Test 2. Frame leakage test on back frame joints only



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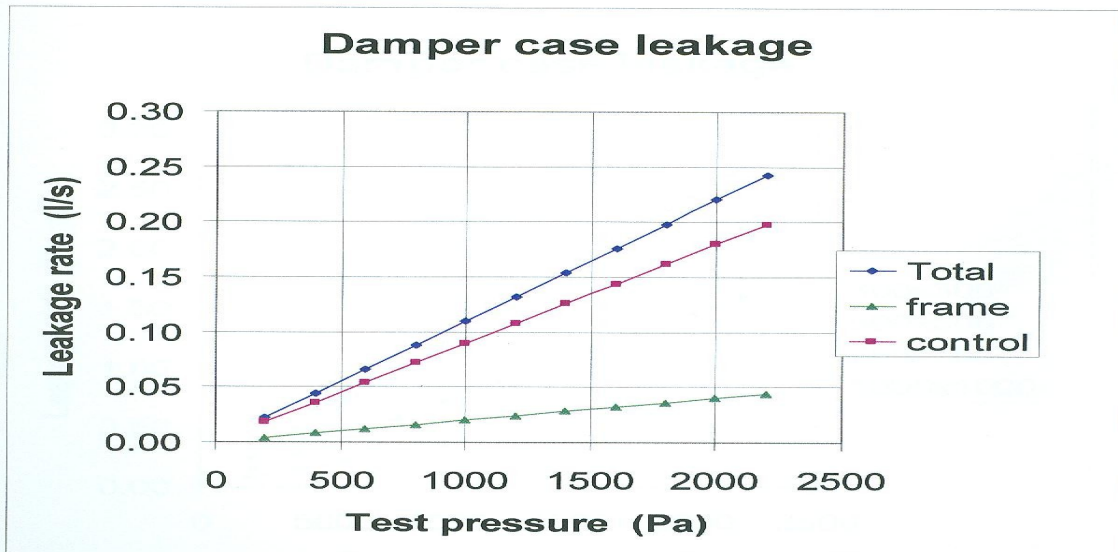
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Multi-blade volume control damper leakage

Table 4: Calculated leakage from test results

pressure Pa	Total l/s	frame l/s	control l/s	control handle + 2 side frames + rig leakage			total l/s/m ²	frame l/s/m ²	Class A l/s/m ²	Class B l/s/m ²	Class C l/s/m ²
				test 1 l/s	test 2 l/s	test 3 l/s					
200	0.022	0.004	0.018	0.040	0.020	0.018	0.244	0.044	0.88	0.28	0.09
400	0.044	0.008	0.036	0.080	0.040	0.036	0.489	0.089	1.39	0.43	0.15
600	0.066	0.012	0.054	0.120	0.060	0.054	0.733	0.133	1.82	0.56	0.19
800	0.088	0.016	0.072	0.160	0.080	0.072	0.978	0.178	2.20	0.67	0.23
1000	0.110	0.020	0.090	0.200	0.100	0.090	1.222	0.222	2.54	0.78	0.27
1200	0.132	0.024	0.108	0.240	0.120	0.108	1.467	0.267	2.86	0.87	0.31
1400	0.154	0.028	0.126	0.280	0.140	0.126	1.711	0.311	3.17	0.96	0.34
1600	0.176	0.032	0.144	0.320	0.160	0.144	1.956	0.356	3.46	1.05	0.37
1800	0.198	0.036	0.162	0.360	0.180	0.162	2.200	0.400	3.74	1.13	0.40
2000	0.220	0.040	0.180	0.400	0.200	0.180	2.444	0.444	4.01	1.20	0.43
2200	0.242	0.044	0.198	0.440	0.220	0.198	2.689	0.489	4.26	1.28	0.46

Graph 4: Calculated leakage from test results



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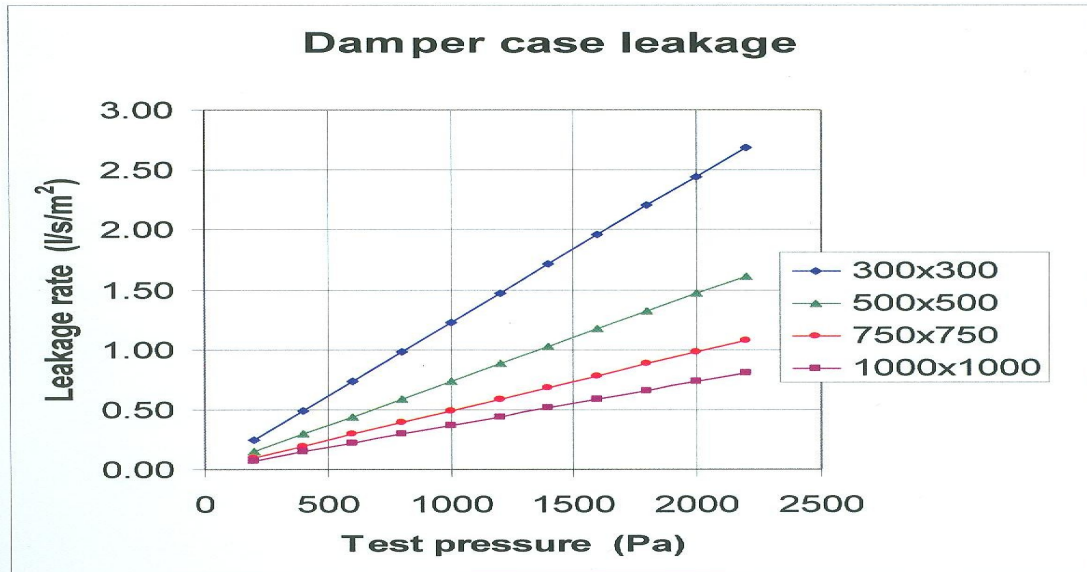
A J Services

Multi-blade volume control damper leakage

Table 5: Calculated leakage for different size of frame

area size	0.090				0.150				0.225				0.300				BS EN 1751:1999 classification		
	300x300				500x500				750x750				000x1000				Class A	Class B	Class C
Pressure	Damper leakage												Maximum leakage						
Pa	l/s/m ²			l/s/m ²			l/s/m ²			l/s/m ²			l/s/m ²	l/s/m ²	l/s/m ²				
200	0.244			0.147			0.098			0.073			0.88	0.28	0.09				
400	0.489			0.293			0.196			0.147			1.39	0.43	0.15				
600	0.733			0.440			0.293			0.220			1.82	0.56	0.19				
800	0.978			0.587			0.391			0.293			2.20	0.67	0.23				
1000	1.222			0.733			0.489			0.367			2.54	0.78	0.27				
1200	1.467			0.880			0.587			0.440			2.86	0.87	0.31				
1400	1.711			1.027			0.684			0.513			3.17	0.96	0.34				
1600	1.956			1.173			0.782			0.587			3.46	1.05	0.37				
1800	2.200			1.320			0.880			0.660			3.74	1.13	0.40				
2000	2.444			1.467			0.978			0.733			4.01	1.20	0.43				
2200	2.689			1.613			1.076			0.807			4.26	1.28	0.46				

Graph 5: Calculated leakage for different size of frame



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MULTI-LEAF VOLUME CONTROL DAMPER BSRIA TEST REPORT DETAILS

A J Services

Multi-blade volume control damper leakage

Instrumentation

Test Equipment /Instruments

Instrument No

Calibration expiry date

Manometer
Air measurement venturi (8 mm)
Linier flow air measurement device

502	February 03
No2	January 03
125	January 03

Test unit reference number

17160A1CHS 300 x 300 x 75 mm

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