

# WI-Air Control Units



WOLF INTERNATIONAL

## DESCRIPTION

|                 |       |
|-----------------|-------|
| VCD.....        | Pg 03 |
| RVCD.....       | Pg 06 |
| MVCD.....       | Pg 10 |
| FD-CT.....      | Pg 13 |
| FD-LT.....      | Pg 18 |
| MFD.....        | Pg 21 |
| MFSD.....       | Pg 24 |
| NRD.....        | Pg 27 |
| PRD (DUCT)..... | Pg 30 |
| PRD (WALL)..... | Pg 33 |
| SILENCER.....   | Pg 34 |
| VAV.....        | Pg 40 |



# VOLUME CONTROL DAMPER

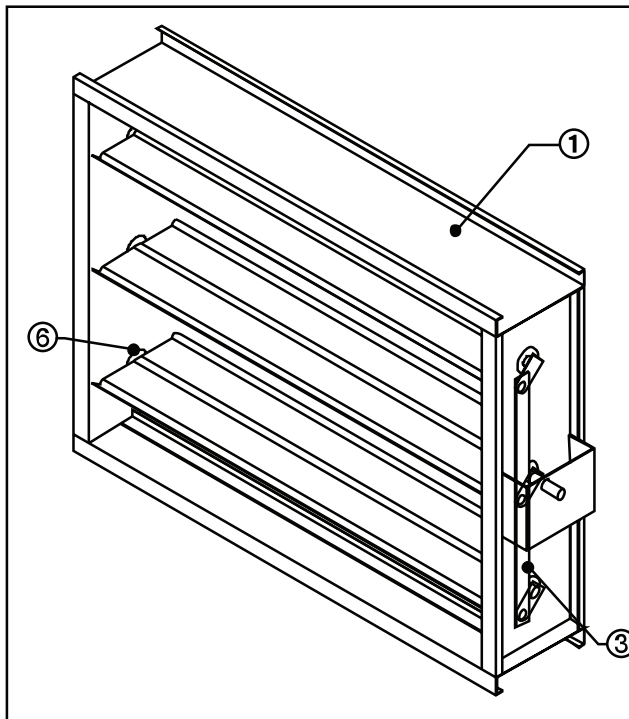


Product Code

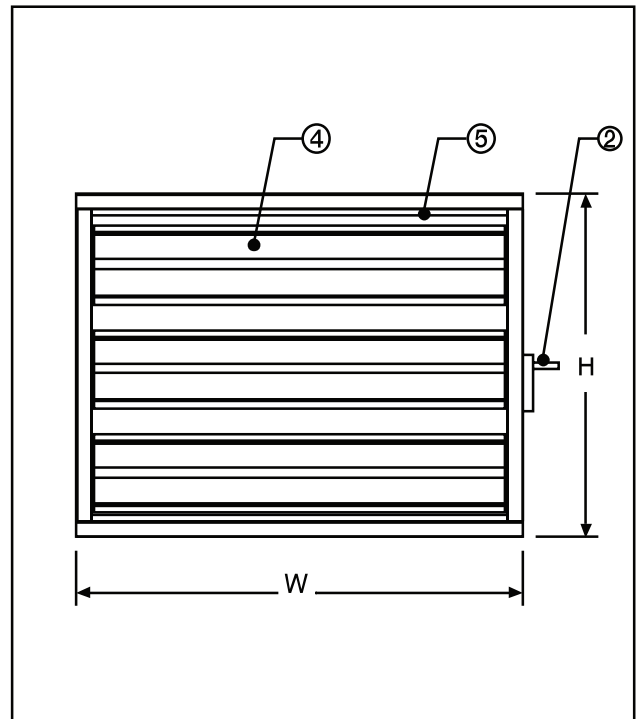
**VCD**

| Blade Frame             | 0.8mm<br>0.8mm                                                                                                                                                                                                         | 1.2mm<br>0.8mm | 0.8mm<br>0.8mm                                | 1.2mm<br>0.8mm |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------------|----------------|
| Linkage                 | Mild Steel link pin, crank and control bar with zink finishing                                                                                                                                                         |                | S/S link pin, crank and control bar           |                |
| Axles and Control Shaft | 9mm x 9mm Square shaft with zink plated mild steel                                                                                                                                                                     |                | 9.53mm x 9.53mm Square shaft with zink plated |                |
| Bearing                 | Nylon Bearing (284°)                                                                                                                                                                                                   |                | S/S Bearing                                   |                |
| Side Seal               | Aluminium                                                                                                                                                                                                              |                | S/S 301                                       |                |
| Blade Action            | Opposed                                                                                                                                                                                                                |                |                                               |                |
| Accessories             | Netting<br>Adaptor                                                                                                                                                                                                     |                |                                               |                |
| Type of Controller      | Quadrant Handle<br>Worm Gear<br>Actuator<br>Pneumatic                                                                                                                                                                  |                |                                               |                |
| Controller Position     | External Damper(Standard)<br>Internal Damper(Available)                                                                                                                                                                |                |                                               |                |
| Type of Connection      | Both Side TDC Joint<br>Both Side Slip Joint<br>Both Side No Joint<br>Both Side Flange Joint<br>1 Side TDC joint, 1 Side No Joint<br>1 Side TDC joint, 1 Side Slip Joint<br>1 Side Slip joint, 1 Side No Joint          |                |                                               |                |
| Product Detail          | Minimum Frame Size<br>150mm(W) x 150mm(H)<br>Maximun Frame Size<br>2700mm x 700mm<br>Minimum Blade Size<br>150mm Length<br>Maximun Blade Size<br>900mm Length<br>(Blade size length above 900mm will have centre bone) |                |                                               |                |

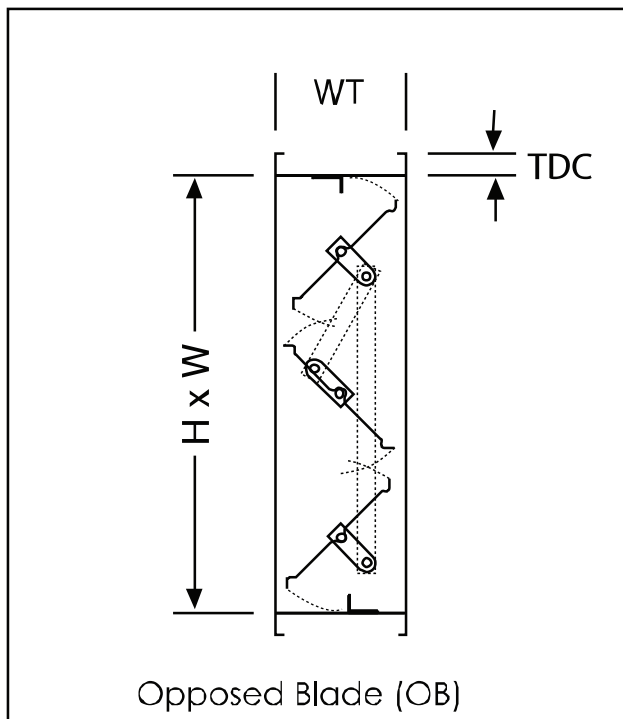
## TDC Joint



## TDCJoint



## Oppoesd Blade

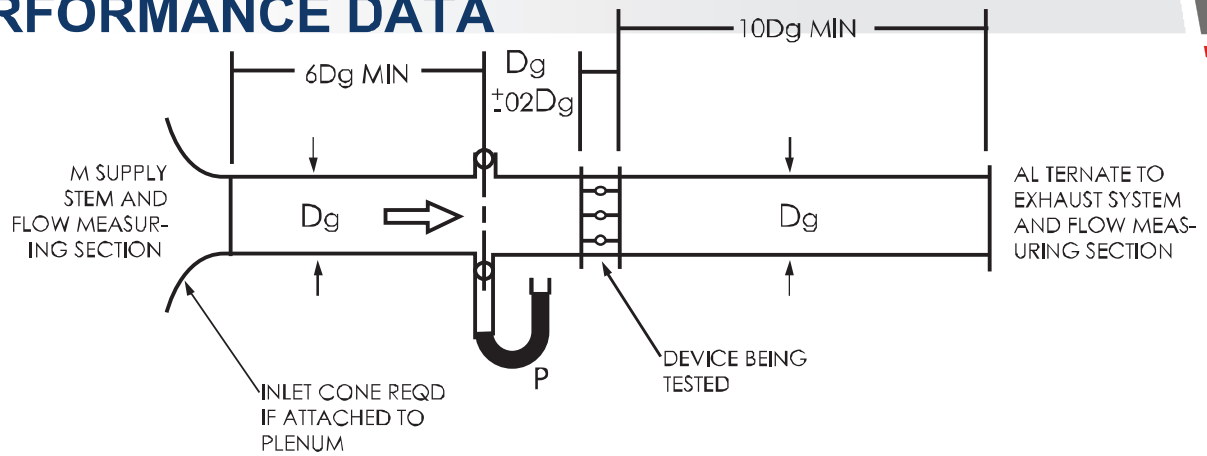


## Standard Sizes

| W in mm | H in mm | Number of Blades |
|---------|---------|------------------|
| 100     | 100     | 1                |
| 150     | 150     | 1                |
| 200     | 200     | 1                |
| 250     | 250     | 1                |
| 300     | 300     | 2                |
| 350     | 350     | 2                |
| 400     | 400     | 2                |
| 450     | 450     | 2                |
| 500     | 500     | 3                |
| 550     | 600     | 3                |
| 600     | 700     | 4                |
| 650     | 800     | 5                |
| 700     | 900     | 5                |
| 750     | 1000    | 6                |
| 800     | 1100    | 7                |
| 850     | 1200    | 7                |
| 900     | 1300    | 8                |
| 950     | 1400    | 9                |
| 1000    | 1500    | 9                |
| 1050    | 1600    | 10               |
| 1100    | 1700    | 11               |
| 1200    | 1800    | 12               |

1). Casing 2). Drive Shaft 3). Side Linkage 4). Blade 5). Landing Angles 6). Bearing

# PERFORMANCE DATA



AMCA Standard 500

Figure above damper test setup with inlet and outlet ducts.

AMCA Standard Figure above is a damper insertion loss under ideal conditions.

(fully developed air flow upstream and length for static regain downstream of the damper)

| Neck Size (mm) | Tested Static Pressure (PA)                            |      |      |      |      |      |      |      |      |      |
|----------------|--------------------------------------------------------|------|------|------|------|------|------|------|------|------|
|                | 250                                                    | 500  | 750  | 1000 | 1250 | 1500 | 1750 | 2000 | 2500 | 3000 |
|                | pressure drop across volume control damper (L/S / SQM) |      |      |      |      |      |      |      |      |      |
| 300 x 300      | 2.7                                                    | 2.9  | 2.9  | 3.2  | 3.6  | 4.2  | 4.7  | 5.2  | 6.1  | 7.2  |
| 600 x 600      | 4.1                                                    | 4.3  | 5.5  | 4.5  | 5.7  | 7.6  | 8.3  | 9.7  | 10.4 | 13.1 |
| 900 x 900      | 6.9                                                    | 7.8  | 9.2  | 9.9  | 10.3 | 11.0 | 12.3 | 12.5 | 13.0 | 15.2 |
| 1200 x 1200    | 10.2                                                   | 10.9 | 12.3 | 13.9 | 14.4 | 14.9 | 15.2 | 15.3 | 17.0 | 19.3 |
| 1500 x 1500    | 13.3                                                   | 14.5 | 15.5 | 15.9 | 16.1 | 16.7 | 18.1 | 19.0 | 20.7 | 22.3 |

| Neck Size (mm) | WIDTH (mm)      |      |       |       |       |
|----------------|-----------------|------|-------|-------|-------|
|                | 300             | 600  | 900   | 1200  | 1500  |
|                | Free area ratio |      |       |       |       |
| 300            | 0.72            | 1.65 | 2.58  | 3.5   | 4.43  |
| 600            | 1.48            | 3.38 | 5.28  | 7.19  | 9.09  |
| 900            | 2.06            | 4.69 | 7.33  | 9.96  | 12.59 |
| 1200           | 2.75            | 6.27 | 9.79  | 13.31 | 16.82 |
| 1500           | 3.44            | 7.84 | 12.25 | 16.65 | 21.06 |

\*based on 1500FPM (7.62m/s)

## TYPE OF JOINTS





# ROUND VOLUME CONTROL DAMPER

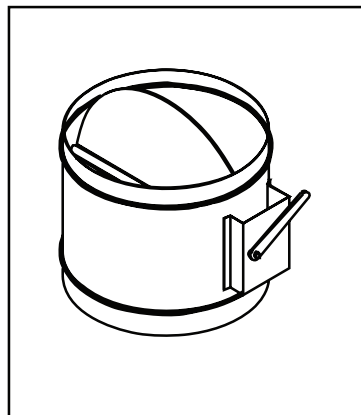


Product Code

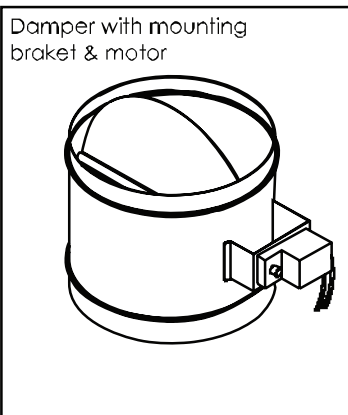
**RVCD**

| Blade Frame        | 0.6mm                                                                                                                                                                                                                                | 0.6mm | 0.6mm                                                                          | 0.8mm |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------------------------------------------------------------|-------|
|                    | 0.6mm                                                                                                                                                                                                                                | 0.6mm | 0.6mm                                                                          | 0.8mm |
| Shaft              | Extension Square Bar<br>9mm x 9mm                                                                                                                                                                                                    |       | Extension Square Bar<br>9.53mm x 9.53mm                                        |       |
| Bearing            | Nylon Bearing (284°)                                                                                                                                                                                                                 |       | S/S Bearing<br>Above Ø 400mm use S/S Bearing<br>Less then Ø 400mm use S/S Bush |       |
| Side Seal          | Aluminium                                                                                                                                                                                                                            |       |                                                                                |       |
| Blade Action       | Opposed                                                                                                                                                                                                                              |       |                                                                                |       |
| Type of Controller | Flange<br>Flexible Duct                                                                                                                                                                                                              |       |                                                                                |       |
| Type of Controller | Quadrant Handle<br>Worm Gear<br>Actuator<br>Pneumatic                                                                                                                                                                                |       |                                                                                |       |
| Type of Model      | Round Volume Control Damper<br>Round Volume Control Damper (Heavy Duty)                                                                                                                                                              |       |                                                                                |       |
| Linkage Blue       | Blue Zinc Cranks and Mind Steel<br>Blue Zink Falt Bar                                                                                                                                                                                |       |                                                                                |       |
|                    | Minimum Frame Size<br>Ø75mm<br>Maximum Frame Size<br>Unlimited (Traind personnel are at your disposal)<br>Minimum Blade Size<br>Ø75mm (Less than Ø400mm is Single Blade)<br>Maximum Blade Size<br>Above Ø400mm will have Multi Blade |       |                                                                                |       |
| Product Detail     |                                                                                                                                                                                                                                      |       |                                                                                |       |
| Note               | Less than Ø400mm is Single Blade<br>Above Ø400mm is Multi Blade                                                                                                                                                                      |       |                                                                                |       |

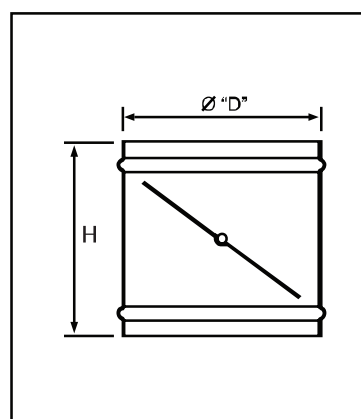
Standard Construction



Mounting Bracket



Section Details



Standard Sizes

| Dia<br>MM | Height<br>MM |
|-----------|--------------|
| 100       | 150          |
| 150       | 150          |
| 200       | 150          |
| 250       | 200          |
| 300       | 250          |
| 350       | 300          |
| 400       | 350          |
| 450 Above | 200          |

The end joints are also available with factory applied self sealing gaskets.

1 - Casing 2 - Blade 3 - Drive Shaft

## PERFORMANCE DATA

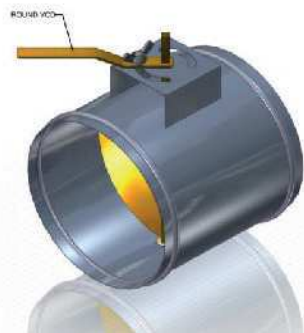
| INLET DIAMETER<br>(mm) / (inches) | TESTED MAXIMUM<br>SYSTEM BACK<br>PRESSURE (PA) | TESTED MAXIMUM<br>SYSTEM VELOCITY<br>(m/s) | LEAKAGE<br>(1/s per sqm) |
|-----------------------------------|------------------------------------------------|--------------------------------------------|--------------------------|
| 75 (3")                           | 4                                              | 8                                          | 6.0                      |
| 100 (4")                          | 4                                              | 8                                          | 7.2                      |
| 150 (6")                          | 4                                              | 8                                          | 10.6                     |
| 200 (8")                          | 4                                              | 8                                          | 12.8                     |
| 250 (10")                         | 4                                              | 8                                          | 14.0                     |
| 300 (12")                         | 4                                              | 8                                          | 16.7                     |
| 400 (14")                         | 4                                              | 8                                          | 18.9                     |
| 500 (16")                         | 4                                              | 8                                          | 21.6                     |



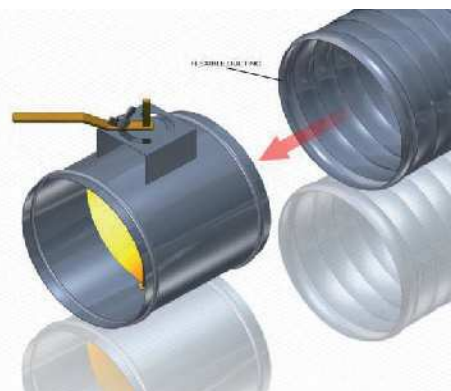
# PERFORMANCE DATA

| NECK SIZE (mm) |   | NECK AREA (m <sup>2</sup> ) | TESTED VELOCITY (m/s) | 2.0   | 2.5   | 3.0   | 4.0   | 5.0   | 6.0    | 7.0    | 8.0    | 9.0    | 10.0   |
|----------------|---|-----------------------------|-----------------------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|
| 75             | Ø | 0.0044                      | Pressure Drop (PA)    | 4.0   | 4.0   | 5.0   | 6.0   | 6.7   | 8.5    | 10.3   | 12.1   | 14.3   | 16.7   |
|                |   |                             | Airflow (l/s)         | 8.8   | 11.0  | 13.2  | 17.7  | 22.1  | 26.5   | 30.9   | 35.3   | 39.7   | 44.2   |
|                |   |                             | NC                    | <15   | <15   | 18    | 22    | 26    | 30     | 34     | 38     | 42     | 46     |
| 100            | Ø | 0.0079                      | Pressure Drop (PA)    | 5.0   | 5.0   | 6.0   | 7.2   | 9.2   | 10.7   | 13.2   | 15.3   | 16.8   | 19.2   |
|                |   |                             | Airflow (l/s)         | 15.7  | 19.6  | 23.6  | 31.4  | 39.3  | 47.1   | 55.0   | 62.8   | 70.7   | 78.5   |
|                |   |                             | NC                    | <18   | <18   | 21    | 23    | 25    | 27     | 29     | 31     | 33     | 35     |
| 125            | Ø | 0.0123                      | Pressure Drop (PA)    | 7.0   | 7.2   | 8.0   | 9.1   | 10.3  | 11.4   | 13.4   | 17.1   | 18.2   | 20.1   |
|                |   |                             | Airflow (l/s)         | 24.5  | 30.7  | 36.8  | 49.1  | 61.3  | 73.6   | 85.9   | 98.1   | 110.4  | 122.7  |
|                |   |                             | NC                    | <18   | <18   | 22    | 24    | 26    | 28     | 30     | 32     | 34     | 36     |
| 150            | Ø | 0.0177                      | Pressure Drop (PA)    | 8.3   | 8.6   | 9.4   | 10.6  | 11.5  | 13.5   | 15.3   | 17.1   | 19.4   | 21.2   |
|                |   |                             | Airflow (l/s)         | 35.3  | 44.2  | 53.0  | 70.7  | 88.3  | 106.0  | 123.7  | 141.3  | 159.0  | 176.7  |
|                |   |                             | NC                    | 18    | 19    | 20    | 22    | 24    | 26     | 28     | 30     | 32     | 34     |
| 175            | Ø | 0.0241                      | Pressure Drop (PA)    | 8.9   | 9.3   | 10.3  | 11.3  | 13.3  | 14.4   | 16.6   | 19.3   | 21.2   | 23.0   |
|                |   |                             | Airflow (l/s)         | 48.1  | 60.1  | 72.1  | 96.2  | 120.2 | 144.3  | 168.3  | 192.4  | 216.4  | 240.5  |
|                |   |                             | NC                    | 18    | 20    | 22    | 26    | 30    | 34     | 38     | 42     | 46     | 50     |
| 200            | Ø | 0.0314                      | Pressure Drop (PA)    | 9.3   | 10.0  | 11.3  | 12.8  | 14.8  | 15.5   | 18.0   | 20.8   | 22.0   | 23.3   |
|                |   |                             | Airflow (l/s)         | 62.8  | 78.5  | 94.2  | 125.6 | 157.0 | 188.4  | 219.8  | 251.3  | 282.7  | 314.1  |
|                |   |                             | NC                    | 20    | 21    | 22    | 24    | 26    | 28     | 30     | 32     | 34     | 36     |
| 225            | Ø | 0.0398                      | Pressure Drop (PA)    | 11.0  | 11.0  | 12.7  | 13.3  | 15.3  | 17.3   | 18.0   | 20.0   | 22.2   | 25.3   |
|                |   |                             | Airflow (l/s)         | 79.5  | 99.4  | 119.2 | 159.0 | 198.7 | 238.5  | 278.2  | 318.0  | 357.7  | 397.5  |
|                |   |                             | NC                    | 21    | 22    | 23    | 25    | 27    | 29     | 31     | 33     | 35     | 37     |
| 250            | Ø | 0.0491                      | Pressure Drop (PA)    | 12.8  | 13.4  | 14.0  | 14.4  | 16.0  | 18.0   | 21.0   | 22.4   | 24.1   | 26.4   |
|                |   |                             | Airflow (l/s)         | 98.1  | 122.7 | 147.2 | 196.3 | 245.4 | 294.4  | 343.5  | 392.6  | 441.7  | 490.7  |
|                |   |                             | NC                    | 22    | 23    | 24    | 26    | 28    | 30     | 32     | 34     | 36     | 38     |
| 275            | Ø | 0.0594                      | Pressure Drop (PA)    | 13.1  | 13.9  | 14.0  | 15.7  | 17.7  | 19.0   | 21.5   | 23.0   | 24.8   | 27.1   |
|                |   |                             | Airflow (l/s)         | 118.8 | 148.4 | 178.1 | 237.5 | 296.9 | 356.3  | 415.6  | 475.0  | 534.4  | 593.8  |
|                |   |                             | NC                    | 23    | 24    | 25    | 27    | 29    | 31     | 33     | 35     | 37     | 39     |
| 300            | Ø | 0.0707                      | Pressure Drop (PA)    | 13.9  | 14.8  | 15.8  | 16.7  | 18.0  | 21.0   | 22.7   | 24.0   | 26.3   | 28.8   |
|                |   |                             | Airflow (l/s)         | 141.3 | 176.7 | 212.0 | 282.7 | 353.3 | 424.0  | 494.7  | 565.3  | 636.0  | 706.7  |
|                |   |                             | NC                    | 24    | 25    | 26    | 28    | 30    | 32     | 34     | 36     | 38     | 40     |
| 400            | Ø | 0.1257                      | Pressure Drop (PA)    | 16.8  | 17.0  | 17.7  | 18.9  | 21.0  | 22.0   | 24.3   | 25.1   | 28.0   | 31.0   |
|                |   |                             | Airflow (l/s)         | 251.3 | 314.1 | 376.9 | 502.5 | 628.1 | 753.8  | 879.4  | 1005.0 | 1130.6 | 1256.3 |
|                |   |                             | NC                    | 26    | 27    | 28    | 30    | 32    | 34     | 36     | 38     | 40     | 42     |
| 500            | Ø | 0.1964                      | Pressure Drop (PA)    | 19.9  | 20.0  | 20.8  | 21.6  | 23.4  | 25.0   | 27.4   | 29.0   | 31.0   | 35.0   |
|                |   |                             | Airflow (l/s)         | 392.6 | 490.7 | 588.9 | 785.2 | 981.5 | 1177.8 | 1374.0 | 1570.3 | 1766.6 | 1962.9 |
|                |   |                             | NC                    | 28    | 29    | 30    | 32    | 34    | 36     | 38     | 40     | 42     | 44     |

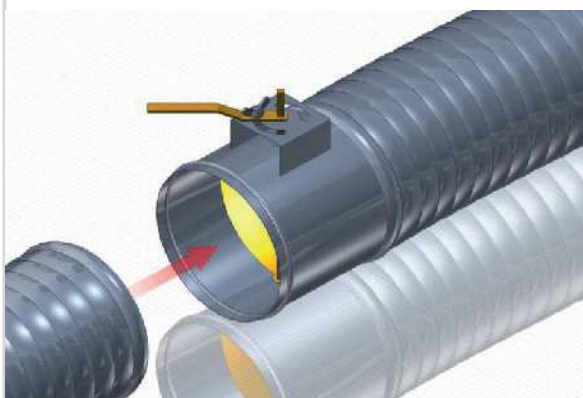
Step (1) - Make Sure the RVCD Size is Correct.



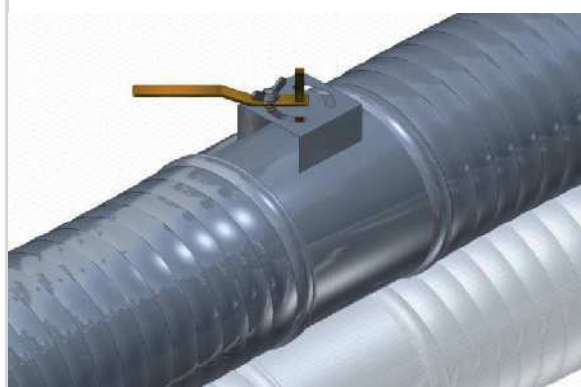
Step (2) - Attach / Slot in 1 Side of the RVCD to the Flexible duct.



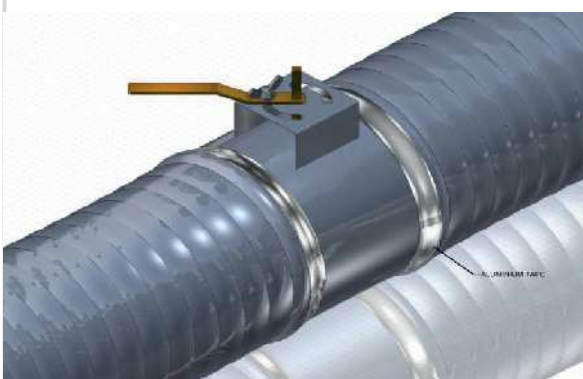
Step (3) - Attach / Slot in Another Side of the RVCD to the Flexible duct.



Step (4) - Make Sure Both Side of the RVCD Was Well Attached to the Flexible duct.



Step (5) - Apply the Aluminium Tape at the Both Side of the Connection Area.



Step (6) - RVCD Installation Done.





# MOTORISED VOLUME CONTROL DAMPER



Product Code

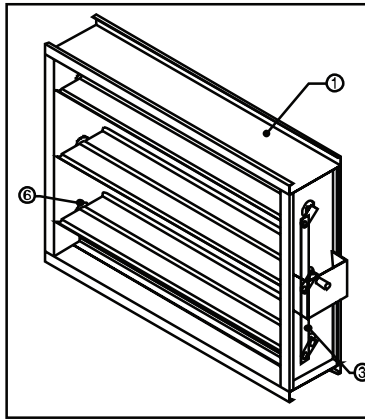
**MVCD**

| Blade Frame             | 0.8mm                                                                                                                                                                                                                  | 1.2mm | 0.8mm                                                        | 1.2mm |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------------------------------------------|-------|
|                         | 0.8mm                                                                                                                                                                                                                  | 0.8mm | 0.8mm                                                        | 0.8mm |
| Linkage                 | Mild Steel link pin, crank and control bar with zink finishing                                                                                                                                                         |       | S/S link pin, crank and control bar                          |       |
| Axles and Control Shaft | 9mm x 9mm Square shaft with zink plated mild steel                                                                                                                                                                     |       | 9.53mm x 9.53mm Square shaft with zink plated                |       |
| Bearing                 | Nylon Bearing (284°)<br>Side Seal : Aluminium<br>Blade Action : Opposed                                                                                                                                                |       | S/S Bearing<br>Side Seal : S/S 301<br>Blade Action : Opposed |       |
| Accessories             | Netting<br>Adaptor                                                                                                                                                                                                     |       |                                                              |       |
| Type of Controller      | Quadrant Handle<br>Worm Gear<br>Actuator<br>Pneumatic                                                                                                                                                                  |       |                                                              |       |
| Controller Position     | External Damper(Standard)<br>Internal Damper(Available)                                                                                                                                                                |       |                                                              |       |
| Type of Connection      | Both Side TDC Joint<br>Both Side Slip Joint<br>Both Side No Joint<br>Both Side Flange Joint<br>1 Side TDC joint, 1 Side No Joint<br>1 Side TDC joint, 1 Side Slip Joint<br>1 Side Slip joint, 1 Side No Joint          |       |                                                              |       |
| Product Detail          | Minimum Frame Size<br>150mm(W) x 150mm(H)<br>Maximun Frame Size<br>2700mm x 700mm<br>Minimum Blade Size<br>150mm Length<br>Maximun Blade Size<br>900mm Length<br>(Blade size length above 900mm will have centre bone) |       |                                                              |       |

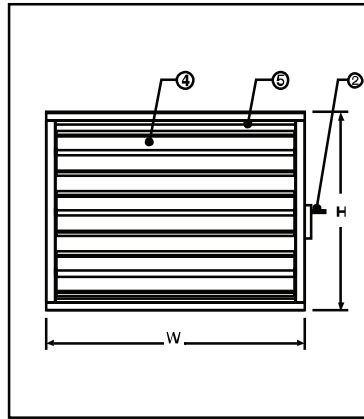
# DIMENSIONS, PERFORMANCE DATA



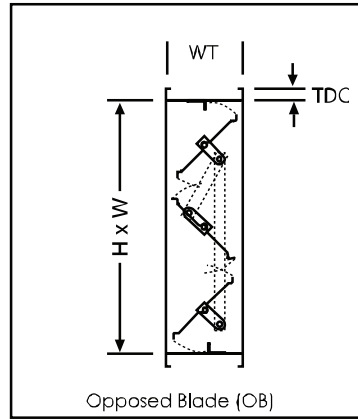
TDC Joint



TDCJoint



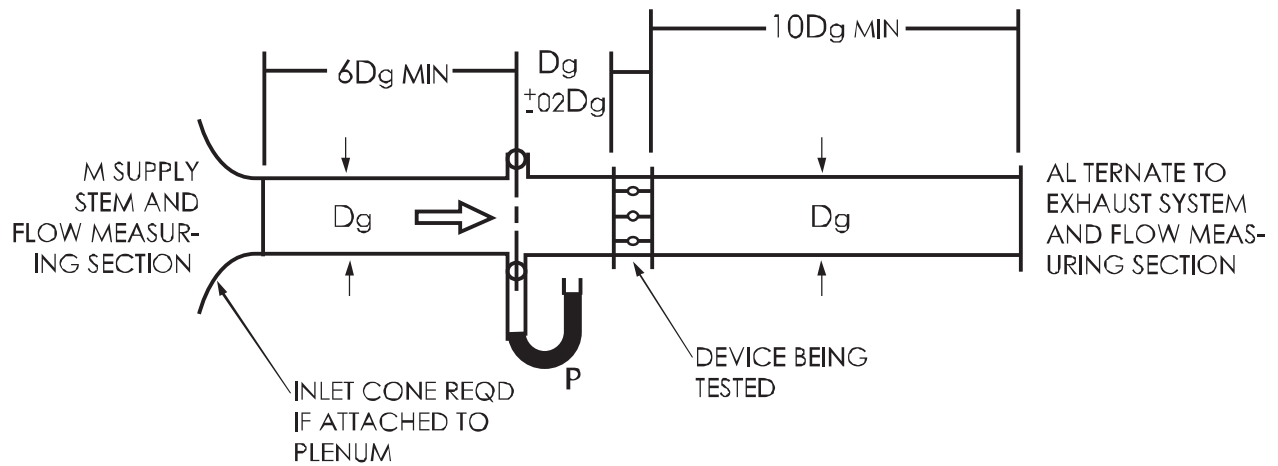
Oppoesd Blade



Standard Sizes

| W in mm | H in mm | Number of Blades |
|---------|---------|------------------|
| 100     | 100     | 1                |
| 150     | 150     | 1                |
| 200     | 200     | 1                |
| 250     | 250     | 1                |
| 300     | 300     | 2                |
| 350     | 350     | 2                |
| 400     | 400     | 2                |
| 450     | 450     | 2                |
| 500     | 500     | 3                |
| 550     | 600     | 3                |
| 600     | 700     | 4                |
| 650     | 800     | 5                |
| 700     | 900     | 5                |
| 750     | 1000    | 6                |
| 800     | 1100    | 7                |
| 850     | 1200    | 7                |
| 900     | 1300    | 8                |
| 950     | 1400    | 9                |
| 1000    | 1500    | 9                |
| 1050    | 1600    | 10               |
| 1100    | 1700    | 11               |
| 1200    | 1800    | 12               |

1). Casing 2). Drive Shaft 3). Side Linkage 4). Blade 5). Landing Angles 6). Bearing



AMCA Standard 500

Figure above damper test setup with inlet and outlet ducts.

AMCA Standard Figure above is a damper insertion loss under ideal conditions.

(fully developed air flow upstream and length for static regain downstream of the damper)

| Neck Size (mm) | Tested Static Pressure (PA)                            |      |      |      |      |      |      |      |      |      |
|----------------|--------------------------------------------------------|------|------|------|------|------|------|------|------|------|
|                | 250                                                    | 500  | 750  | 1000 | 1250 | 1500 | 1750 | 2000 | 2500 | 3000 |
|                | pressure drop across volume control damper (L/S / SQM) |      |      |      |      |      |      |      |      |      |
| 300 x 300      | 2.7                                                    | 2.9  | 2.9  | 3.2  | 3.6  | 4.2  | 4.7  | 5.2  | 6.1  | 7.2  |
| 600 x 600      | 4.1                                                    | 4.3  | 5.5  | 4.5  | 5.7  | 7.6  | 8.3  | 9.7  | 10.4 | 13.1 |
| 900 x 900      | 6.9                                                    | 7.8  | 9.2  | 9.9  | 10.3 | 11.0 | 12.3 | 12.5 | 13.0 | 15.2 |
| 1200 x 1200    | 10.2                                                   | 10.9 | 12.3 | 13.9 | 14.4 | 14.9 | 15.2 | 15.3 | 17.0 | 19.3 |
| 1500 x 1500    | 13.3                                                   | 14.5 | 15.5 | 15.9 | 16.1 | 16.7 | 18.1 | 19.0 | 20.7 | 22.3 |

| Neck Size (mm) | WIDTH (mm)      |      |       |       |       |
|----------------|-----------------|------|-------|-------|-------|
|                | 300             | 600  | 900   | 1200  | 1500  |
|                | Free area ratio |      |       |       |       |
| 300            | 0.72            | 1.65 | 2.58  | 3.5   | 4.43  |
| 600            | 1.48            | 3.38 | 5.28  | 7.19  | 9.09  |
| 900            | 2.06            | 4.69 | 7.33  | 9.96  | 12.59 |
| 1200           | 2.75            | 6.27 | 9.79  | 13.31 | 16.82 |
| 1500           | 3.44            | 7.84 | 12.25 | 16.65 | 21.06 |

\*based on 1500FPM (7.62m/s)



# DATASHEET 20000-33000W-3Ph

SLIP JOINT



ANGLE JOINT



TDC JOINT



NO JOINT



1 SIDE JOINT 1 SIDE NO JOINT



FLANGE



## DAMPER ACTUATOR LOCATION

TYPE A



TYPE B



TYPE C



NORMAL TYPE



# FIRE DAMPER - CURTAIN TYPE



Product Code

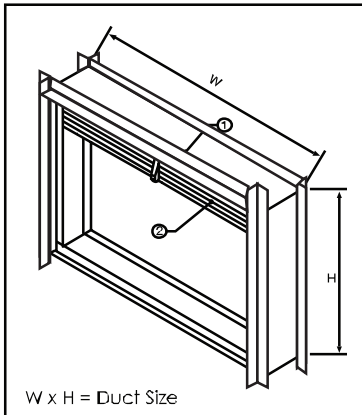
**FDCT**

|                           |                                                                                                                                                                                                                                                                                                     |       |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>Blade</b>              | 1.9mm                                                                                                                                                                                                                                                                                               | 0.9mm |
| <b>Internal Frame</b>     | 1.0mm                                                                                                                                                                                                                                                                                               | 1.0mm |
| <b>External Frame</b>     | 1.0mm                                                                                                                                                                                                                                                                                               | 1.0mm |
| <b>Type of Model</b>      | In Air Screen<br>Out Of Air Screen                                                                                                                                                                                                                                                                  |       |
| <b>Mounting</b>           | Vertical<br>Horizontal                                                                                                                                                                                                                                                                              |       |
| <b>Accessories</b>        | Fusible Link 71°C (Standard)<br>Fusible Link 100°C (Customer Request)<br>Limit Switch<br>Spring (For Monitored Use)<br>Adapter (For Round Duct)<br>Grille (Damper Wall Thickness Must 200mm)                                                                                                        |       |
| <b>Type of Connection</b> | Angle Joint (Inside Wall, Connect Square Duct)                                                                                                                                                                                                                                                      |       |
| <b>Product Detail</b>     | <b>Minimum Frame Size</b><br>150mm(L) x 150mm(H)<br><b>Maximum Frame Size</b><br>3000mm x 1200mm<br>(Multi section assembly with unlimited size)<br><b>Minimum Blade Size</b><br>150mm Length<br><b>Maximum Blade Size</b><br>900mm Length<br>(Blade size length above 900mm will have centre bone) |       |
| <b>Fire Rating</b>        | 4 Hours Fire Rating                                                                                                                                                                                                                                                                                 |       |

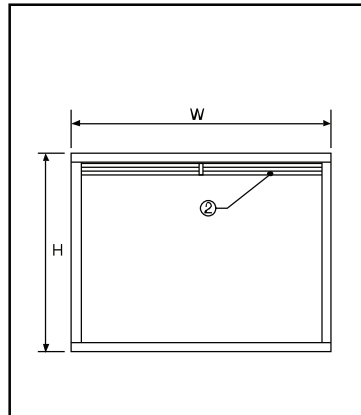


# DIMENSIONS, PERFORMANCE DATA

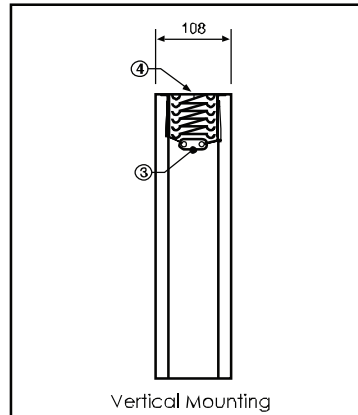
**Damper Blades in Air System**



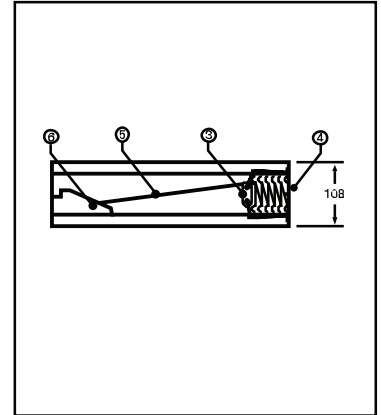
**Damper Blades in Air System**



**Vertical Mounting**



**Horizontal Mounting**



**1 - Galvanized or S/S Casing**

**2 - Galvanized or S/S Blades**

**3 - Fusible Link 74 °C (UL listed)**

**4 - Top Blade riveted to frame**

**5 - S/S closure spring**

**6 - Catch plates**

| HEIGHT<br>(mm) | Airflow       |      |      |      |      |      |      |      |      |      |
|----------------|---------------|------|------|------|------|------|------|------|------|------|
|                | WIDTH (mm)    |      |      |      |      |      |      |      |      |      |
|                | 150           | 300  | 450  | 600  | 750  | 900  | 1050 | 1200 | 1350 | 1500 |
|                | AIRFLOW (L/S) |      |      |      |      |      |      |      |      |      |
| 150            | 59            | 118  | 178  | 237  | 296  | 355  | 415  | 474  | 533  | 592  |
| 300            | 118           | 237  | 355  | 474  | 592  | 711  | 829  | 948  | 1066 | 1184 |
| 450            | 178           | 355  | 533  | 711  | 888  | 1066 | 1244 | 1421 | 1599 | 1777 |
| 600            | 237           | 474  | 711  | 948  | 1184 | 1421 | 1658 | 1895 | 2132 | 2369 |
| 750            | 296           | 592  | 888  | 1184 | 1481 | 1777 | 2073 | 2369 | 2665 | 2961 |
| 900            | 355           | 711  | 1066 | 1421 | 1777 | 2132 | 2487 | 2843 | 3198 | 3553 |
| 1050           | 415           | 829  | 1244 | 1658 | 2073 | 2487 | 2902 | 3316 | 3731 | 4146 |
| 1200           | 474           | 948  | 1421 | 1895 | 2369 | 2843 | 3316 | 3790 | 4264 | 4738 |
| 1350           | 533           | 1066 | 1599 | 2132 | 2665 | 3198 | 3731 | 4264 | 4797 | 5330 |
| 1500           | 592           | 1184 | 1777 | 2369 | 2961 | 3553 | 4146 | 4738 | 5330 | 5922 |

| HEIGHT<br>(mm) | Airflow       |      |      |      |       |       |       |       |       |       |
|----------------|---------------|------|------|------|-------|-------|-------|-------|-------|-------|
|                | WIDTH (mm)    |      |      |      |       |       |       |       |       |       |
|                | 150           | 300  | 450  | 600  | 750   | 900   | 1050  | 1200  | 1350  | 1500  |
|                | AIRFLOW (L/S) |      |      |      |       |       |       |       |       |       |
| 150            | 0.14          | 0.33 | 0.52 | 0.70 | 0.90  | 1.10  | 1.30  | 1.50  | 1.70  | 1.80  |
| 300            | 0.31          | 0.72 | 1.10 | 1.50 | 1.90  | 2.40  | 2.80  | 3.20  | 3.60  | 4.00  |
| 450            | 0.48          | 1.10 | 1.70 | 2.40 | 3.00  | 3.70  | 4.30  | 4.90  | 5.60  | 6.20  |
| 600            | 0.65          | 1.50 | 2.40 | 3.20 | 4.10  | 5.00  | 5.80  | 6.70  | 7.50  | 8.40  |
| 750            | 0.82          | 1.90 | 3.00 | 4.10 | 5.20  | 6.30  | 7.30  | 8.40  | 9.50  | 10.60 |
| 900            | 0.99          | 2.30 | 3.60 | 4.90 | 6.30  | 7.60  | 8.90  | 10.20 | 11.50 | 12.80 |
| 1050           | 1.20          | 2.70 | 4.20 | 5.80 | 7.30  | 8.80  | 10.40 | 11.90 | 13.40 | 15.00 |
| 1200           | 1.30          | 3.10 | 4.90 | 6.60 | 8.40  | 10.20 | 11.90 | 13.70 | 15.50 | 17.20 |
| 1350           | 1.50          | 3.50 | 5.50 | 7.50 | 9.50  | 11.50 | 13.50 | 15.50 | 17.50 | 19.40 |
| 1500           | 1.70          | 3.90 | 6.10 | 8.30 | 10.60 | 12.80 | 15.00 | 17.20 | 19.40 | 21.70 |

Example:

Given: Duct Air Velocity = 1000fpm

Duct Size = Damper Size = 500mm (W) X 500mm (H)

Duct Area = 2.69 ft<sup>2</sup>

Find: Pressure Drop

$Q = \text{Duct Area (ft}^2\text{)} \times \text{Duct Air Velocity (fpm)}$

$= 2.69 \times 1000$

$= 2690 \text{ CFM}$

Refer to the table above, free area for damper size 500mm(W) X 500mm(H) = 1.91 ft<sup>2</sup>

## Formula

$$\Delta P = 1.60 \left[ \frac{\left( \frac{\text{CFM}}{\text{FREE AREA FACTOR}} \right) - \text{Vel.}}{4005} \right]$$

$\Delta P$  = Pressure drop in inches w.g

Vel. = Duct Velocity in feet per minute

CFM = Duct area (sq. ft.) x Vel. (fpm)

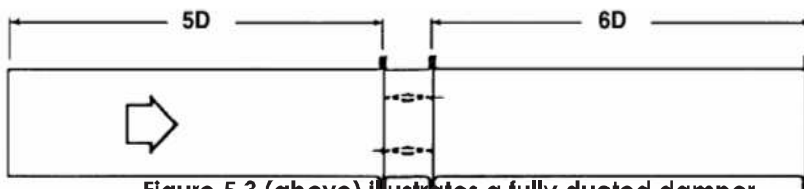
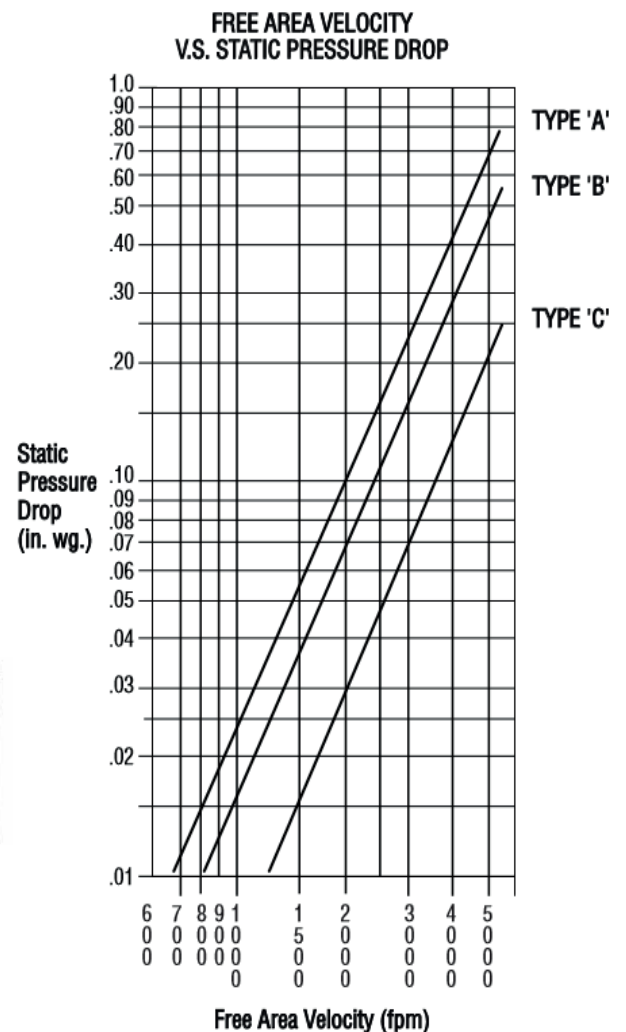


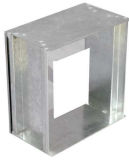
Figure 5.3 (above) illustrates a fully ducted damper.





## TYPE OF JOINTS

SLIP JOINT



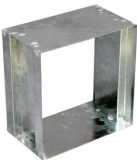
ANGLE JOINT



TDC JOINT



NO JOINT



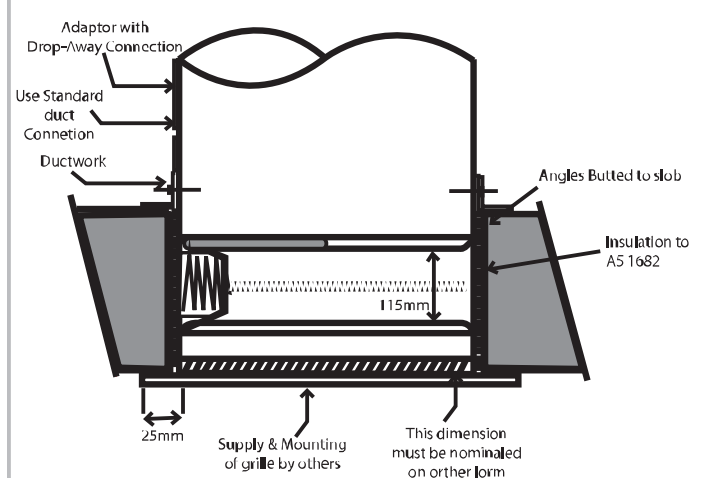
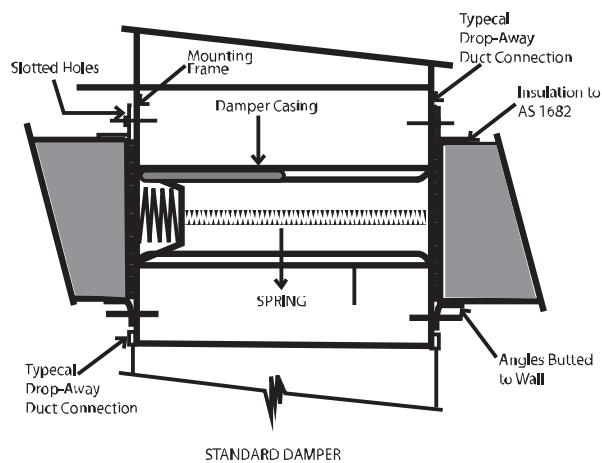
1 SIDE JOINT 1 SIDE NO JOINT



FLANGE JOINT

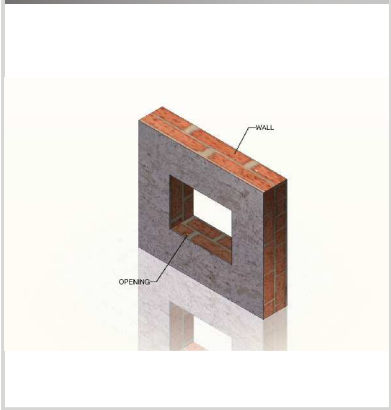


## SLAB MOUNT INSTALLATION DETAILS





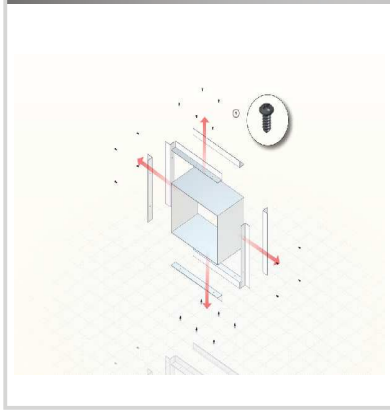
STEP 1



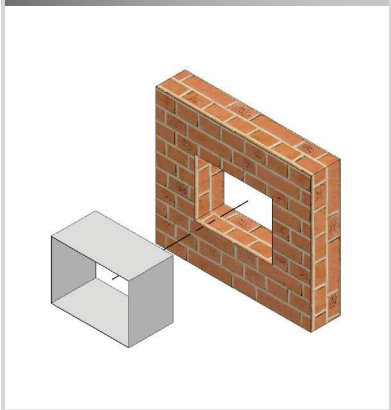
STEP 2



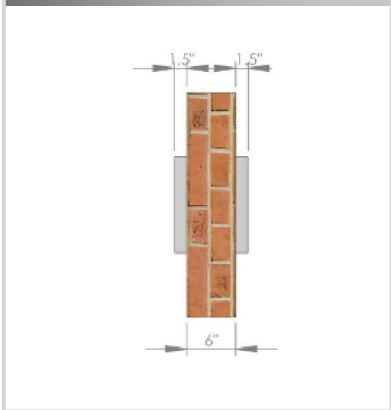
STEP 3



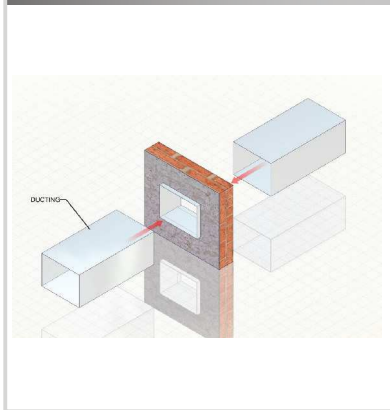
STEP 4



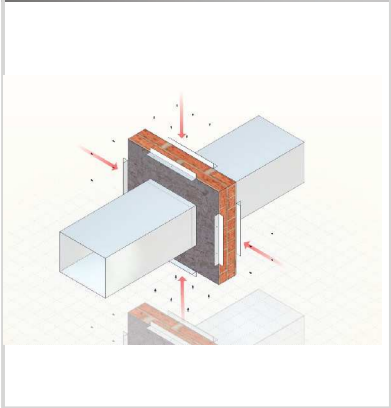
STEP 5



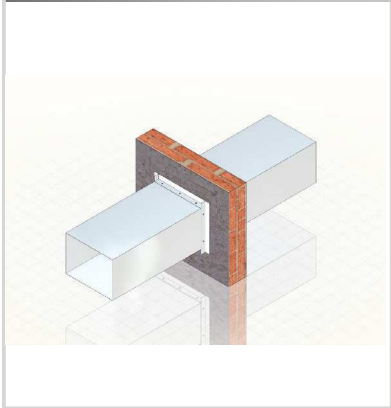
STEP 6



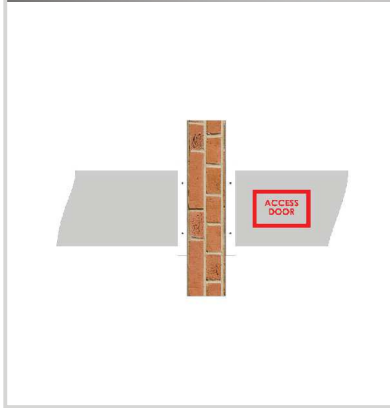
STEP 7



STEP 8



STEP 9





# FIRE DAMPER LOUVER TYPE

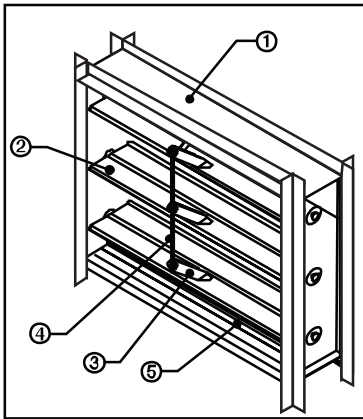


Product Code

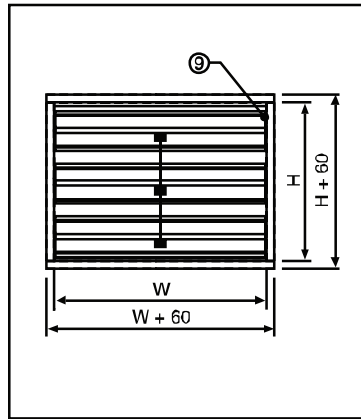
**FDLT**

|                           |                                                                                                                                                                                                                                                                                                    |                                                |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| <b>Blade</b>              | 1.2mm                                                                                                                                                                                                                                                                                              | 1.2mm                                          |
| <b>Frame</b>              | 1.2mm                                                                                                                                                                                                                                                                                              | 1.2mm                                          |
| <b>Linkage</b>            | S/S Pivot Pin<br>Set Screw<br>Mild Steel Round Shaft Ø12.7mm<br>8mm Round Shaft                                                                                                                                                                                                                    |                                                |
| <b>Bearing</b>            | Copper Bush + Tarbular Bush With<br>Nickel Chromed                                                                                                                                                                                                                                                 | Stainless Steel +<br>Stainless Steel Bush With |
| <b>Shaft</b>              | Mild Steel Round Shaft Ø12.7mm                                                                                                                                                                                                                                                                     | Stainless Steel Round Shaft Ø12.7mm            |
| <b>Blade Action</b>       | Paralle                                                                                                                                                                                                                                                                                            |                                                |
| <b>Accessories</b>        | Fusible Link 71°C (Standard)<br>Fusible Link 100°C (Customer Request)<br>Limit Swict<br>Spring (For Monuted Used)<br>Adapter (For Round Duct)<br>Grille (Damper Wall Thickness Must 200mm)                                                                                                         |                                                |
| <b>Fire Rating</b>        | 4 Hours Fire Rating                                                                                                                                                                                                                                                                                |                                                |
| <b>Type of Connection</b> | Both Side TDC Joint<br>Both Side Slip Joint<br>Both Side No Joint<br>Both Side Flange Joint<br>1 Side TDC joint, 1 Side No Joint<br>1 Side TDC joint, 1 Side Slip Joint<br>1 Side Slip joint, 1 Side No Joint                                                                                      |                                                |
| <b>Product Detail</b>     | <b>Minimum Frame Size</b><br>150mm(W) x 150mm(H)<br><b>Maximun Frame Size</b><br>3000mm x 1200mm (Multi section assembly with unlimited size)<br><b>Minimum Blade Size</b><br>150mm Length<br><b>Maximun Blade Size</b><br>1200mm Length (Blade size length above 1200mm<br>will have centre bone) |                                                |

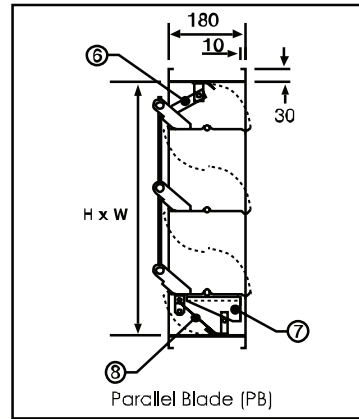
Parallel Blades



Parallel Blades



Flange Type



Standard Sizes

| W<br>in mm | H<br>in mm | Number<br>of Blades |  |
|------------|------------|---------------------|--|
| 100        | 200        | 1                   |  |
| 150        | 250        | 1                   |  |
| 200        | 300        | 2                   |  |
| 250        | 350        | 2                   |  |
| 300        | 400        | 2                   |  |
| 350        | 450        | 2                   |  |
| 400        | 500        | 3                   |  |
| 450        | 600        | 3                   |  |
| 500        | 700        | 4                   |  |
| 550        | 800        | 4                   |  |
| 600        | 900        | 5                   |  |
| 650        | 1000       | 6                   |  |
| 700        |            |                     |  |
| 750        |            |                     |  |
| 800        |            |                     |  |
| 850        |            |                     |  |
| 900        |            |                     |  |
| 950        |            |                     |  |

1 - Casing  
2 - Blade  
3 - Face Linkage

4 - Linkag Bar  
5 - Landing Angles  
6 - Fusible Link 74 °C (UL listed)

7 - Catch Device  
8 - Closing Spring  
9 - Side Seal

## PERFORMANCE DATA

| HEIGHT<br>(mm) | Airflow       |      |      |      |      |      |      |      |      |      |
|----------------|---------------|------|------|------|------|------|------|------|------|------|
|                | WIDTH (mm)    |      |      |      |      |      |      |      |      |      |
|                | 150           | 300  | 450  | 600  | 750  | 900  | 1050 | 1200 | 1350 | 1500 |
|                | AIRFLOW (L/S) |      |      |      |      |      |      |      |      |      |
| 150            | 59            | 118  | 178  | 237  | 296  | 355  | 415  | 474  | 533  | 592  |
| 300            | 118           | 237  | 355  | 474  | 592  | 711  | 829  | 948  | 1066 | 1184 |
| 450            | 178           | 355  | 533  | 711  | 888  | 1066 | 1244 | 1421 | 1599 | 1777 |
| 600            | 237           | 474  | 711  | 948  | 1184 | 1421 | 1658 | 1895 | 2132 | 2369 |
| 750            | 296           | 592  | 888  | 1184 | 1481 | 1777 | 2073 | 2369 | 2665 | 2961 |
| 900            | 355           | 711  | 1066 | 1421 | 1777 | 2132 | 2487 | 2843 | 3198 | 3553 |
| 1050           | 415           | 829  | 1244 | 1658 | 2073 | 2487 | 2902 | 3316 | 3731 | 4146 |
| 1200           | 474           | 948  | 1421 | 1895 | 2369 | 2843 | 3316 | 3790 | 4264 | 4738 |
| 1350           | 533           | 1066 | 1599 | 2132 | 2665 | 3198 | 3731 | 4264 | 4797 | 5330 |
| 1500           | 592           | 1184 | 1777 | 2369 | 2961 | 3553 | 4146 | 4738 | 5330 | 5922 |

| HEIGHT<br>(mm) | Airflow       |      |      |      |       |       |       |       |       |       |
|----------------|---------------|------|------|------|-------|-------|-------|-------|-------|-------|
|                | WIDTH (mm)    |      |      |      |       |       |       |       |       |       |
|                | 150           | 300  | 450  | 600  | 750   | 900   | 1050  | 1200  | 1350  | 1500  |
|                | AIRFLOW (L/S) |      |      |      |       |       |       |       |       |       |
| 150            | 0.14          | 0.33 | 0.52 | 0.70 | 0.90  | 1.10  | 1.30  | 1.50  | 1.70  | 1.80  |
| 300            | 0.31          | 0.72 | 1.10 | 1.50 | 1.90  | 2.40  | 2.80  | 3.20  | 3.60  | 4.00  |
| 450            | 0.48          | 1.10 | 1.70 | 2.40 | 3.00  | 3.70  | 4.30  | 4.90  | 5.60  | 6.20  |
| 600            | 0.65          | 1.50 | 2.40 | 3.20 | 4.10  | 5.00  | 5.80  | 6.70  | 7.50  | 8.40  |
| 750            | 0.82          | 1.90 | 3.00 | 4.10 | 5.20  | 6.30  | 7.30  | 8.40  | 9.50  | 10.60 |
| 900            | 0.99          | 2.30 | 3.60 | 4.90 | 6.30  | 7.60  | 8.90  | 10.20 | 11.50 | 12.80 |
| 1050           | 1.20          | 2.70 | 4.20 | 5.80 | 7.30  | 8.80  | 10.40 | 11.90 | 13.40 | 15.00 |
| 1200           | 1.30          | 3.10 | 4.90 | 6.60 | 8.40  | 10.20 | 11.90 | 13.70 | 15.50 | 17.20 |
| 1350           | 1.50          | 3.50 | 5.50 | 7.50 | 9.50  | 11.50 | 13.50 | 15.50 | 17.50 | 19.40 |
| 1500           | 1.70          | 3.90 | 6.10 | 8.30 | 10.60 | 12.80 | 15.00 | 17.20 | 19.40 | 21.70 |



Example:

Given: Duct Air Velocity = 1000fpm

Duct Size = Damper Size = 500mm (W) X 500mm (H)

Duct Area = 2.69 ft<sup>2</sup>

Find: Pressure Drop

$Q = \text{Duct Area (ft}^2\text{)} \times \text{Duct Air Velocity (fpm)}$

$= 2.69 \times 1000$

$= 2690 \text{ CFM}$

Refer to the table above, free area for damper size 500mm(W) X 500mm(H) = 1.91 ft<sup>2</sup>

## Formula

$$\Delta P = 1.60 \left[ \frac{\left( \frac{\text{CFM}}{\text{FREE AREA FACTOR}} \right) - \text{Vel.}}{4005} \right]$$

$\Delta P$  = Pressure drop in inches w.g

Vel. = Duct Velocity in feet per minute

CFM = Duct area (sq. ft.) x Vel. (fpm)

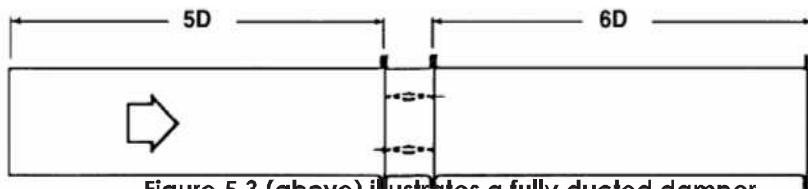
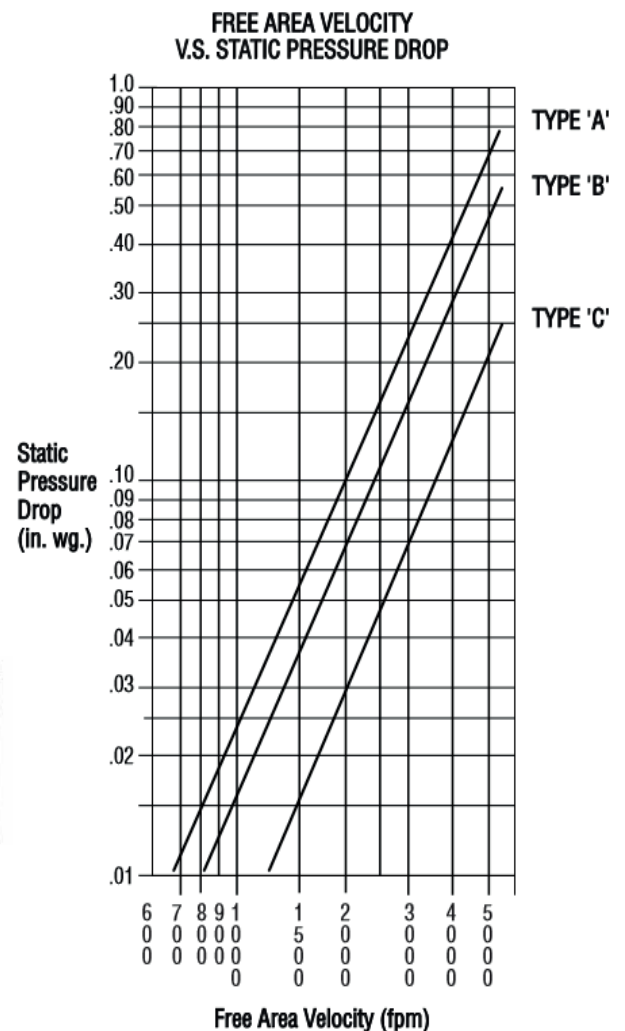


Figure 5.3 (above) illustrates a fully ducted damper.





Product Code

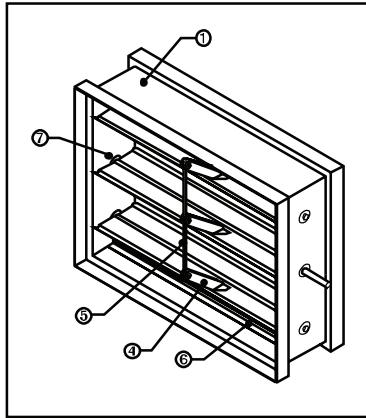
**MFD**

|                           |                                                                                                                                                                                                                                                      |                                                |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| <b>Blade</b>              | 1.2mm                                                                                                                                                                                                                                                | 1.2mm                                          |
|                           | 1.2mm                                                                                                                                                                                                                                                | 1.2mm                                          |
| <b>Frame</b>              |                                                                                                                                                                                                                                                      |                                                |
| <b>Bush</b>               | Copper Bush + Galvanized<br>Tubular Bush With Nickel Chromed                                                                                                                                                                                         | Stainless Steel +<br>Stainless Steel Bush With |
| <b>Linkage</b>            | Galvanized Steel 12.7mm Thickness                                                                                                                                                                                                                    |                                                |
| <b>Shaft</b>              | Blue Zinc Galvanized Shaft 8mm Thickness                                                                                                                                                                                                             |                                                |
| <b>Type of Motor</b>      | Belimo<br>Nanutec<br>Honeywell                                                                                                                                                                                                                       |                                                |
| <b>Accessories</b>        | Fusible Link 71°C (Standard)<br>Fusible Link 100°C (Customer Request)<br>*other temperature can be requested*                                                                                                                                        |                                                |
| <b>Type of Connection</b> | Both Side TDC Joint<br>Both Side Slip Joint<br>Both Side No Joint<br>Both Side Flange Joint<br>1 Side TDC joint, 1 Side No Joint<br>1 Side TDC joint, 1 Side Slip Joint<br>1 Side Slip joint, 1 Side No Joint<br>1 Side Slip joint, 1 Side TDC Joint |                                                |

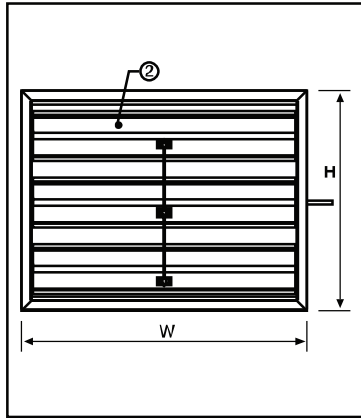


# DIMENSIONS

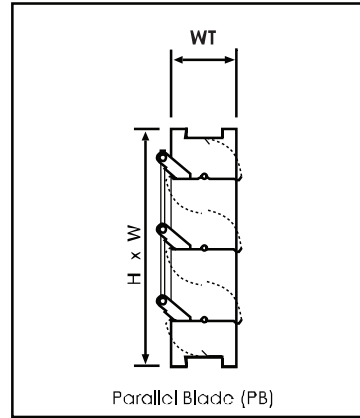
Angle Joint



Angle Joint



Angle Joint Parallel Blades



Standard Sizes

| W<br>in mm | H<br>in mm | Number<br>of Blades |  |
|------------|------------|---------------------|--|
| 100        | 100        | 1                   |  |
| 150        | 150        | 1                   |  |
| 200        | 200        | 1                   |  |
| 250        | 250        | 1                   |  |
| 300        | 300        | 1                   |  |
| 350        | 350        | 2                   |  |
| 400        | 400        | 2                   |  |
| 450        | 450        | 2                   |  |
| 500        | 500        | 2                   |  |
| 550        | 600        | 3                   |  |
| 600        | 700        | 4                   |  |
| 650        | 800        | 4                   |  |
| 700        | 900        | 5                   |  |
| 750        | 1000       | 6                   |  |
| 800        | 1100       | 6                   |  |
| 850        | 1200       | 7                   |  |
| 900        | 1300       | 8                   |  |
| 950        | 1400       | 8                   |  |
| 1000       | 1500       | 9                   |  |
| 1050       | 1600       | 10                  |  |
| 1100       | 1700       | 11                  |  |

1 - Casing

2 - Blade

3 - Drive Shaft

4 - Linkage

5 - Linkage Bar

6 - Landing angles

7 - Bearing

## PERFORMANCE DATA

| HEIGHT<br>(mm) | Airflow       |      |      |      |      |      |      |      |      |      |
|----------------|---------------|------|------|------|------|------|------|------|------|------|
|                | WIDTH (mm)    |      |      |      |      |      |      |      |      |      |
|                | 150           | 300  | 450  | 600  | 750  | 900  | 1050 | 1200 | 1350 | 1500 |
|                | AIRFLOW (L/S) |      |      |      |      |      |      |      |      |      |
| 150            | 59            | 118  | 178  | 237  | 296  | 355  | 415  | 474  | 533  | 592  |
| 300            | 118           | 237  | 355  | 474  | 592  | 711  | 829  | 948  | 1066 | 1184 |
| 450            | 178           | 355  | 533  | 711  | 888  | 1066 | 1244 | 1421 | 1599 | 1777 |
| 600            | 237           | 474  | 711  | 948  | 1184 | 1421 | 1658 | 1895 | 2132 | 2369 |
| 750            | 296           | 592  | 888  | 1184 | 1481 | 1777 | 2073 | 2369 | 2665 | 2961 |
| 900            | 355           | 711  | 1066 | 1421 | 1777 | 2132 | 2487 | 2843 | 3198 | 3553 |
| 1050           | 415           | 829  | 1244 | 1658 | 2073 | 2487 | 2902 | 3316 | 3731 | 4146 |
| 1200           | 474           | 948  | 1421 | 1895 | 2369 | 2843 | 3316 | 3790 | 4264 | 4738 |
| 1350           | 533           | 1066 | 1599 | 2132 | 2665 | 3198 | 3731 | 4264 | 4797 | 5330 |
| 1500           | 592           | 1184 | 1777 | 2369 | 2961 | 3553 | 4146 | 4738 | 5330 | 5922 |

| HEIGHT<br>(mm) | Airflow       |      |      |      |       |       |       |       |       |       |
|----------------|---------------|------|------|------|-------|-------|-------|-------|-------|-------|
|                | WIDTH (mm)    |      |      |      |       |       |       |       |       |       |
|                | 150           | 300  | 450  | 600  | 750   | 900   | 1050  | 1200  | 1350  | 1500  |
|                | AIRFLOW (L/S) |      |      |      |       |       |       |       |       |       |
| 150            | 0.14          | 0.33 | 0.52 | 0.70 | 0.90  | 1.10  | 1.30  | 1.50  | 1.70  | 1.80  |
| 300            | 0.31          | 0.72 | 1.10 | 1.50 | 1.90  | 2.40  | 2.80  | 3.20  | 3.60  | 4.00  |
| 450            | 0.48          | 1.10 | 1.70 | 2.40 | 3.00  | 3.70  | 4.30  | 4.90  | 5.60  | 6.20  |
| 600            | 0.65          | 1.50 | 2.40 | 3.20 | 4.10  | 5.00  | 5.80  | 6.70  | 7.50  | 8.40  |
| 750            | 0.82          | 1.90 | 3.00 | 4.10 | 5.20  | 6.30  | 7.30  | 8.40  | 9.50  | 10.60 |
| 900            | 0.99          | 2.30 | 3.60 | 4.90 | 6.30  | 7.60  | 8.90  | 10.20 | 11.50 | 12.80 |
| 1050           | 1.20          | 2.70 | 4.20 | 5.80 | 7.30  | 8.80  | 10.40 | 11.90 | 13.40 | 15.00 |
| 1200           | 1.30          | 3.10 | 4.90 | 6.60 | 8.40  | 10.20 | 11.90 | 13.70 | 15.50 | 17.20 |
| 1350           | 1.50          | 3.50 | 5.50 | 7.50 | 9.50  | 11.50 | 13.50 | 15.50 | 17.50 | 19.40 |
| 1500           | 1.70          | 3.90 | 6.10 | 8.30 | 10.60 | 12.80 | 15.00 | 17.20 | 19.40 | 21.70 |

Example:

Given: Duct Air Velocity = 1000fpm

Duct Size = Damper Size = 500mm (W) X 500mm (H)

Duct Area = 2.69 ft<sup>2</sup>

Find: Pressure Drop

$Q = \text{Duct Area (ft}^2\text{)} \times \text{Duct Air Velocity (fpm)}$

$= 2.69 \times 1000$

$= 2690 \text{ CFM}$

Refer to the table above, free area for damper size 500mm(W) X 500mm(H) = 1.91 ft<sup>2</sup>

**Formula**

$$\Delta P = 1.60 \left[ \frac{\left( \frac{\text{CFM}}{\text{FREE AREA FACTOR}} \right) - \text{Vel.}}{4005} \right]^2$$

$\Delta P$  = Pressure drop in inches w.g.  
 Vel. = Duct Velocity in feet per minute  
 CFM = Duct area (sq. ft.) x Vel. (fpm)

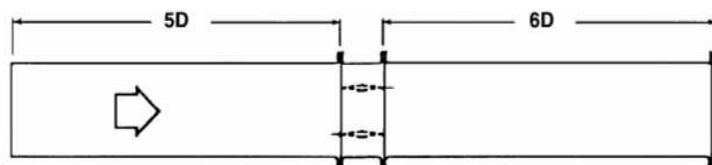
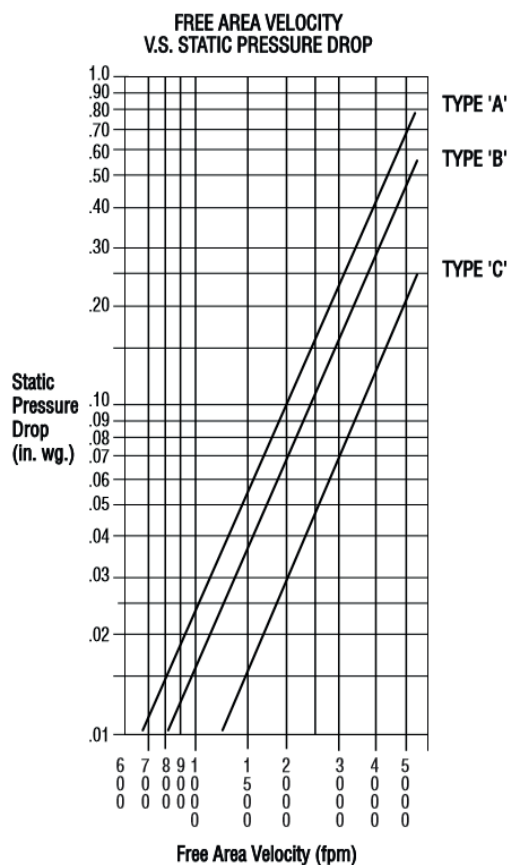


Figure 5.3 (above) illustrates a fully ducted damper.





# MOTORISED FIRE AND SMOKE DAMPER

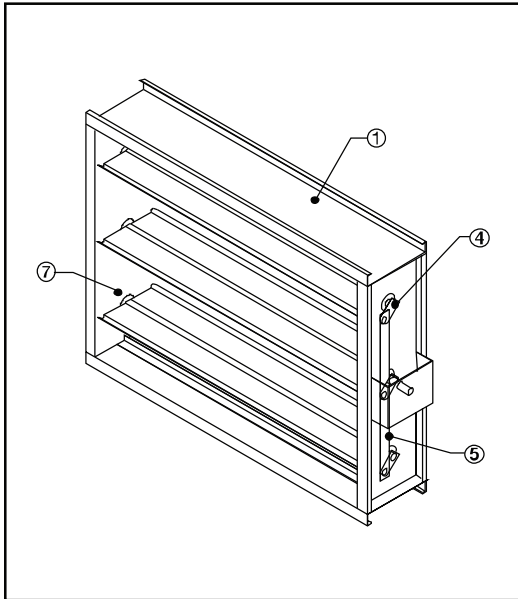


Product Code

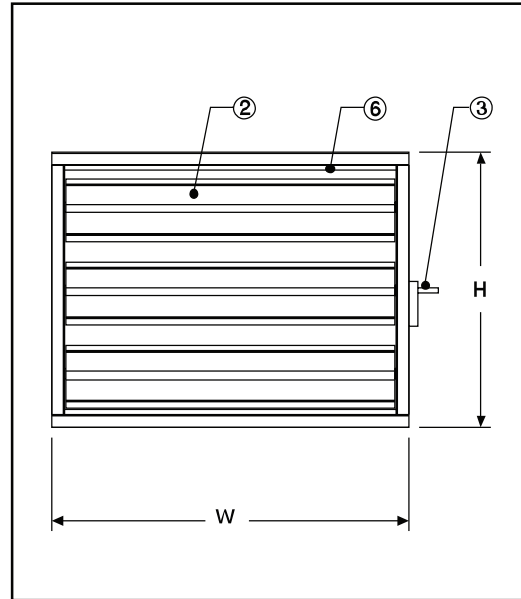
**MFSD**

|                    |                                                                                                                                                                            |                         |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
|                    |                                                                                                                                                                            |                         |
| Blade Frame        | 1.5mm<br>(with Gasket FPDM Material)<br>1.2mm                                                                                                                              |                         |
| Linkage            | Blue Zink finishing cranks and Blue Zink Flat bar                                                                                                                          |                         |
| Shaft              | Mild Steel Hexagon Bar Ø12.7mm<br>with blue Zink finishing                                                                                                                 | S/S Hexagon Bar Ø12.7mm |
| Bearing            | Stainless Steel 301                                                                                                                                                        | Stainless Steel         |
| Side Seal          | Stainless Steel 301                                                                                                                                                        |                         |
| Blade Action       | Opposed                                                                                                                                                                    |                         |
| Accessories        | Netting<br>Grille / Diffuser<br>Adaptor                                                                                                                                    |                         |
| Type of Connection | Both Side TDC Joint<br>Both Side Angle Joint<br>Both Side No Joint<br>Both Side Flange Joint<br>1 Side TDC joint, 1 Side No Joint<br>1 Side TDC joint, 1 Side Slip Joint   |                         |
| Type of Motor      | Belimo<br>Nanotec<br>Honeywell                                                                                                                                             |                         |
| Actuator Position  | External Damper                                                                                                                                                            |                         |
| Product Detail     | Minimum Frame Size<br>150mm(W) x 150mm(H)<br>Maximum Frame Size<br>1500mm(W) x 1200mm(H)<br>Maximum Blade Size<br>(Blade size length above 750mm<br>will have centre bone) |                         |

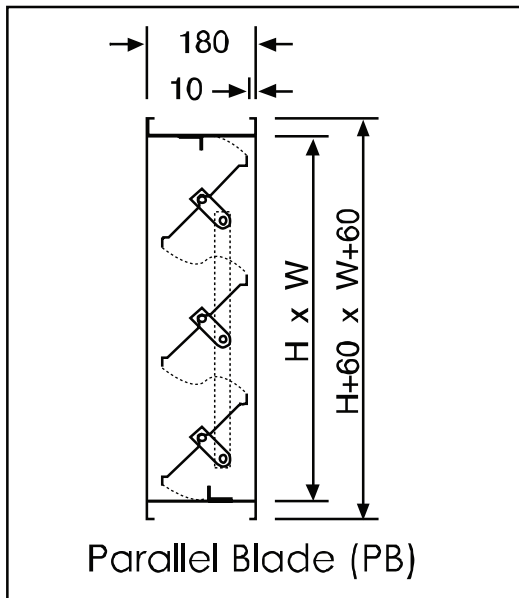
## Parallel Blades



## Parallel Blades



## Flange Type



## Standard Sizes

| W<br>in mm | H<br>in mm | Number<br>of Blades |  |
|------------|------------|---------------------|--|
| 100        | 100        | 1                   |  |
| 150        | 150        | 1                   |  |
| 200        | 200        | 1                   |  |
| 250        | 250        | 1                   |  |
| 300        | 300        | 2                   |  |
| 350        | 350        | 2                   |  |
| 400        | 400        | 2                   |  |
| 450        | 450        | 2                   |  |
| 500        | 500        | 3                   |  |
| 550        | 600        | 3                   |  |
| 600        | 700        | 4                   |  |
| 650        | 800        | 5                   |  |
| 700        | 900        | 5                   |  |
| 750        | 1000       | 6                   |  |
| 800        | 1100       | 7                   |  |
| 850        | 1200       | 7                   |  |
| 900        | 1300       | 8                   |  |
| 950        | 1400       | 9                   |  |
| 1000       | 1500       | 9                   |  |
| 1050       | 1600       | 10                  |  |
| 1100       | 1700       | 11                  |  |
| 1200       | 1800       | 12                  |  |

1 - Casing 2 - Blade 3 - Drive Shaft 4 - Linkage 5 - Linkage Bar 6 - Landing angles 7 - Bearing



# PERFORMANCE DATA

| HEIGHT<br>(mm) | Airflow       |      |      |      |      |      |      |      |      |      |
|----------------|---------------|------|------|------|------|------|------|------|------|------|
|                | WIDTH (mm)    |      |      |      |      |      |      |      |      |      |
|                | 150           | 300  | 450  | 600  | 750  | 900  | 1050 | 1200 | 1350 | 1500 |
|                | AIRFLOW (L/S) |      |      |      |      |      |      |      |      |      |
| 150            | 59            | 118  | 178  | 237  | 296  | 355  | 415  | 474  | 533  | 592  |
| 300            | 118           | 237  | 355  | 474  | 592  | 711  | 829  | 948  | 1066 | 1184 |
| 450            | 178           | 355  | 533  | 711  | 888  | 1066 | 1244 | 1421 | 1599 | 1777 |
| 600            | 237           | 474  | 711  | 948  | 1184 | 1421 | 1658 | 1895 | 2132 | 2369 |
| 750            | 296           | 592  | 888  | 1184 | 1481 | 1777 | 2073 | 2369 | 2665 | 2961 |
| 900            | 355           | 711  | 1066 | 1421 | 1777 | 2132 | 2487 | 2843 | 3198 | 3553 |
| 1050           | 415           | 829  | 1244 | 1658 | 2073 | 2487 | 2902 | 3316 | 3731 | 4146 |
| 1200           | 474           | 948  | 1421 | 1895 | 2369 | 2843 | 3316 | 3790 | 4264 | 4738 |
| 1350           | 533           | 1066 | 1599 | 2132 | 2665 | 3198 | 3731 | 4264 | 4797 | 5330 |
| 1500           | 592           | 1184 | 1777 | 2369 | 2961 | 3553 | 4146 | 4738 | 5330 | 5922 |

| HEIGHT<br>(mm) | Airflow       |      |      |      |       |       |       |       |       |       |
|----------------|---------------|------|------|------|-------|-------|-------|-------|-------|-------|
|                | WIDTH (mm)    |      |      |      |       |       |       |       |       |       |
|                | 150           | 300  | 450  | 600  | 750   | 900   | 1050  | 1200  | 1350  | 1500  |
|                | AIRFLOW (L/S) |      |      |      |       |       |       |       |       |       |
| 150            | 0.14          | 0.33 | 0.52 | 0.70 | 0.90  | 1.10  | 1.30  | 1.50  | 1.70  | 1.80  |
| 300            | 0.31          | 0.72 | 1.10 | 1.50 | 1.90  | 2.40  | 2.80  | 3.20  | 3.60  | 4.00  |
| 450            | 0.48          | 1.10 | 1.70 | 2.40 | 3.00  | 3.70  | 4.30  | 4.90  | 5.60  | 6.20  |
| 600            | 0.65          | 1.50 | 2.40 | 3.20 | 4.10  | 5.00  | 5.80  | 6.70  | 7.50  | 8.40  |
| 750            | 0.82          | 1.90 | 3.00 | 4.10 | 5.20  | 6.30  | 7.30  | 8.40  | 9.50  | 10.60 |
| 900            | 0.99          | 2.30 | 3.60 | 4.90 | 6.30  | 7.60  | 8.90  | 10.20 | 11.50 | 12.80 |
| 1050           | 1.20          | 2.70 | 4.20 | 5.80 | 7.30  | 8.80  | 10.40 | 11.90 | 13.40 | 15.00 |
| 1200           | 1.30          | 3.10 | 4.90 | 6.60 | 8.40  | 10.20 | 11.90 | 13.70 | 15.50 | 17.20 |
| 1350           | 1.50          | 3.50 | 5.50 | 7.50 | 9.50  | 11.50 | 13.50 | 15.50 | 17.50 | 19.40 |
| 1500           | 1.70          | 3.90 | 6.10 | 8.30 | 10.60 | 12.80 | 15.00 | 17.20 | 19.40 | 21.70 |

| Damper Air Leakage classification of UL555S |                                                   |       |       |        |
|---------------------------------------------|---------------------------------------------------|-------|-------|--------|
|                                             | Maximum permissible damper leakage rate (l/s/msq) |       |       |        |
| Classification                              | 250pa                                             | 500pa | 750pa | 1000pa |
| I                                           | 20.5                                              | 41.0  | 56.0  | 71.0   |
| II                                          | 51.0                                              | 102.0 | 143.0 | 178.5  |
| III                                         | 204.0                                             | 408.0 | 571.0 | 714.0  |
| IV                                          | 306.0                                             | 612.0 | 857.0 | 1071.0 |

| Pressure Differential<br>Across Damper (Pa) | Air Leakage (l/s) |
|---------------------------------------------|-------------------|
| 250                                         | 4.12              |
| 500                                         | 4.33              |
| 750                                         | 5.54              |
| 1000                                        | 4.45              |
| 1250                                        | 5.74              |
| 1500                                        | 7.64              |
| 1750                                        | 8.29              |
| 2000                                        | 9.72              |
| 2500                                        | 10.4              |
| 3000                                        | 13.1              |

Example:

Given: Duct Air Velocity = 1000fpm

Duct Size = Damper Size = 500mm (W) X 500mm (H)

Duct Area = 2.69 ft<sup>2</sup>

Find: Pressure Drop

$Q = \text{Duct Area (ft}^2\text{)} \times \text{Duct Air Velocity (fpm)}$

= 2.69 X 1000

= 2690 CFM

Refer to the table above, free area for damper size 500mm(W) X 500mm(H) = 1.91 ft<sup>2</sup>

# NON RETURN DAMPER

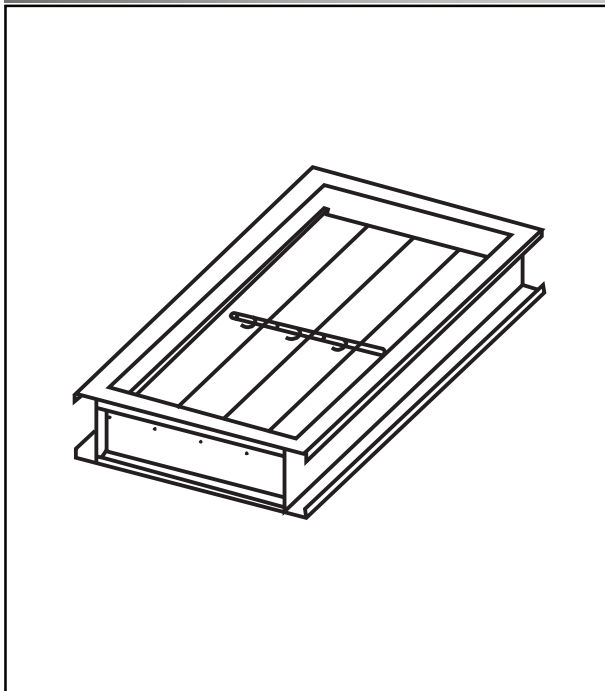


Product Code

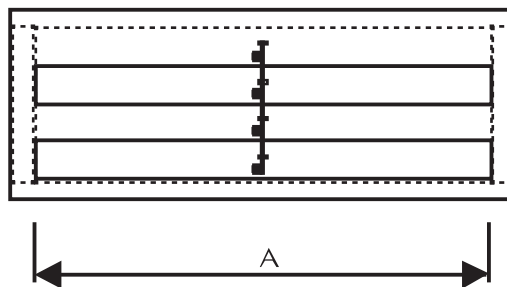
**NRD**

|                | Blade                                                                                                                                                                                                                                               | Frame                                                                               | Linkage                                                                          | Shaft |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-------|
|                | Aluminium Blade 0.8mm                                                                                                                                                                                                                               | Galvanized Steel 0.6mm                                                              | 0.6mm                                                                            | 0.8mm |
|                | Galvanized Steel 0.8mm                                                                                                                                                                                                                              | Galvanized Steel 0.8mm                                                              | 0.8mm                                                                            | 0.8mm |
|                | AL Angle Bar<br>AL Flat Bar<br>Nylon<br>Semi Hollow riverts with<br>zin finishing<br>M6 Push on Clip                                                                                                                                                | Mild Steel Flat Bar<br>Semi Hollow riverts with<br>zin finishing<br>M6 Push on Clip | S/S Flat Bar<br>S/S Semi Hollow riverts with<br>zin finishing<br>M6 Push on Clip |       |
|                | Mild Steed Round Shaft<br>Ø6mm with zink finishing                                                                                                                                                                                                  | Mild Steed Round Shaft<br>Ø6mm with zink finishing<br>M6 Push on Clip               | S/S Round Shaft Ø12.7mm                                                          |       |
|                | Bush                                                                                                                                                                                                                                                | M6 Nylon Bush                                                                       | M12.8 Coper Bush                                                                 |       |
| Blade Action   | Paralle                                                                                                                                                                                                                                             |                                                                                     |                                                                                  |       |
| Accessories    | Netting<br>Adaptor<br>Grille<br>Counterweight                                                                                                                                                                                                       |                                                                                     |                                                                                  |       |
| Type of Joint  | Both Side TDC Joint<br>Both Side Slip Joint<br>Both Side No Joint<br>Both Side Flange Joint<br>1 Side TDC joint, 1 Side No Joint<br>1 Side TDC joint, 1 Side Slip Joint<br>1 Side Slip joint, 1 Side No Joint                                       |                                                                                     |                                                                                  |       |
| Product Detail | <b>Minimum Frame Size</b><br>150mm(W) x 150mm(H)<br><b>Maximun Frame Size</b><br>2700mm x 1800mm<br><b>Minimum Blade Size</b><br>150mm Length<br><b>Maximun Blade Size</b><br>750mm Length<br>(Blade size length above 750mm will have centre bone) |                                                                                     |                                                                                  |       |

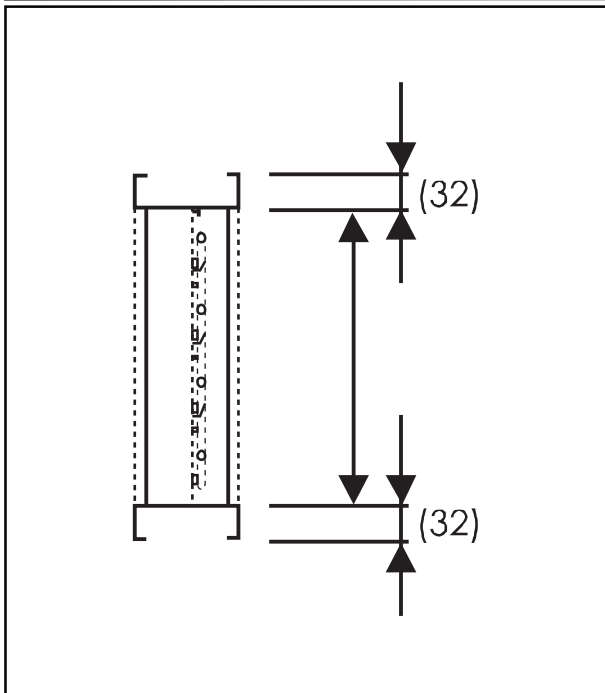
TDC Type



TDC Type



Opposed Blade



Standard Sizes

| W(mm)-(A) | H(mm)-(B) |
|-----------|-----------|
| 100       | 100       |
| 200       | 100       |
| 300       | 150       |
| 400       | 200       |
| 500       | 250       |
| 600       | 300       |
| 700       | 350       |
| 800       | 400       |
| 900       | 450       |
| 1000      | 500       |

# PERFORMANCE DATA



| Leakage table             |                                                |                                            |                      |
|---------------------------|------------------------------------------------|--------------------------------------------|----------------------|
| Damper Width<br>mm (inch) | TESTED MAXIMUM<br>SYSTEM BACK<br>PRESSURE (PA) | TESTED MAXIMUM<br>SYSTEM VELOCITY<br>(m/s) | LEAKAGE<br>(LPS/SQM) |
| 300 (12")                 | 1250                                           | 5.0                                        | 23                   |
| 600 (24")                 | 1000                                           | 5.0                                        | 20                   |
| 900 (36")                 | 750                                            | 5.0                                        | 16                   |
| 1200 (48")                | 500                                            | 5.0                                        | 13                   |
| 1500 (60")                | 250                                            | 5.0                                        | 9                    |

\*Leakage information is based on differential pressure of 250pa

| total pressure drop vs air velocity |     |     |     |     |     |
|-------------------------------------|-----|-----|-----|-----|-----|
| AIR VELOCITY<br>(m/s)               | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 |
| TOTAL PRESSURE<br>DROP (PA)         | 18  | 25  | 29  | 33  | 42  |

| HEIGHT<br>(mm) | WIDTH (mm)    |      |      |      |      |
|----------------|---------------|------|------|------|------|
|                | 300           | 600  | 900  | 1200 | 1500 |
|                | AIRFLOW (L/S) |      |      |      |      |
| 300            | 237           | 474  | 711  | 948  | 1184 |
| 600            | 474           | 948  | 1421 | 1895 | 2369 |
| 900            | 711           | 1421 | 2132 | 2843 | 3553 |
| 1200           | 948           | 1895 | 2843 | 3790 | 4738 |
| 1500           | 1184          | 2369 | 3553 | 4738 | 5922 |

\*Airflow rate based on 2.5m/s

## TYPE OF JONITS





# PRESSURE RELIEF DAMPER

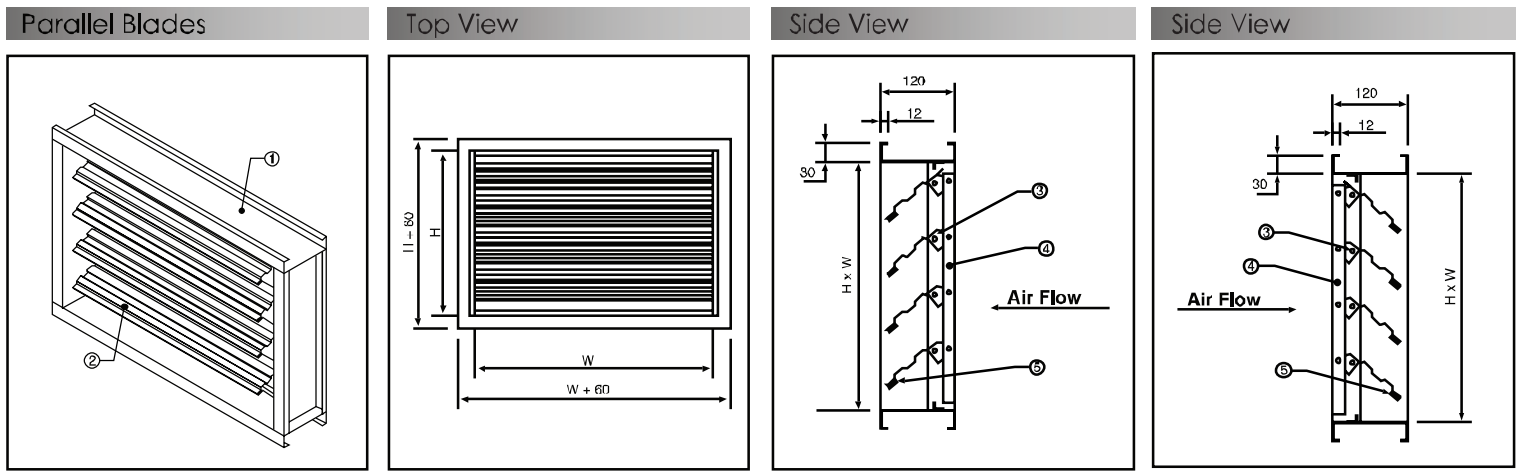


Product Code

**(Duct Mounted)**

**PRD (DM)**

| Blade Frame     | Aluminium Extrusion 0.85mm                                                                                                                                                                                              | Galvanized Steel 0.6mm                                                           | 0.6mm                                                                         | 0.8mm |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------|
|                 | Galvanized Steel 0.8mm                                                                                                                                                                                                  | Galvanized Steel 0.8mm                                                           | 0.8mm                                                                         | 0.8mm |
| Linkage         | AL Angle Bar<br>AL Flat Bar<br>Nylon<br>Semi Hollow riverts with zin finishing<br>M6 Push on Clip                                                                                                                       | Mild Steel Flat Bar<br>Semi Hollow riverts with zin finishing<br>M6 Push on Clip | S/S Flat Bar<br>S/S Semi Hollow riverts with zin finishing<br>M6 Push on Clip |       |
|                 | Mild Steed Round Shaft<br>Ø6mm with zink finishing                                                                                                                                                                      |                                                                                  | S/S Round Shaft Ø12.7mm                                                       |       |
| Bush            | M6 Nylon Bush                                                                                                                                                                                                           | Copper (M12.8 Hole)                                                              | Copper (M12.8 Hole)                                                           |       |
| Blade Action    | Parallel                                                                                                                                                                                                                |                                                                                  |                                                                               |       |
| Counter-balance | Mild Steel Round Shaft Ø25mm x 38mm (0.128gm) with powder coating                                                                                                                                                       |                                                                                  |                                                                               |       |
| Accessories     | Grille                                                                                                                                                                                                                  |                                                                                  |                                                                               |       |
| Type of Joint   | Both Side TDC Joint<br>Both Side Slip Joint<br>Both Side No Joint<br>Both Side Flange Joint<br>1 Side TDC joint, 1 Side No Joint<br>1 Side TDC joint, 1 Side Slip Joint<br>1 Side Slip joint, 1 Side No Joint           |                                                                                  |                                                                               |       |
|                 |                                                                                                                                                                                                                         |                                                                                  |                                                                               |       |
| Product Detail  | Minimum Frame Size<br>150mm(W) x 150mm(H)<br>Maximum Frame Size<br>1800mm x 1800mm<br>Minimum Blade Size<br>150mm Length<br>Maximum Blade Size<br>750mm Length<br>(Blade size length above 750mm will have centre bone) |                                                                                  |                                                                               |       |
|                 |                                                                                                                                                                                                                         |                                                                                  |                                                                               |       |



1 - Casing 2 - Blade 3 - Bearing Section 4 - Linkag 5 - Sealing Strip

## PERFORMANCE DATA

| Damper Width<br>mm (inch) | Tested Maximum System Back Pressure (PA) | Tested Maximum System Back Velocity (m/s) | LEAKAGE   |                  |
|---------------------------|------------------------------------------|-------------------------------------------|-----------|------------------|
|                           |                                          |                                           | (LPS/SQM) | % of Max Airflow |
| 300 (12")                 | 1200                                     | 5.0                                       | 20        | 4.0              |
| 600 (24")                 | 900                                      | 5.0                                       | 17        | 3.5              |
| 900 (36")                 | 650                                      | 5.0                                       | 15        | 2.5              |
| 1200 (48")                | 350                                      | 5.0                                       | 10        | 1.5              |
| 1500 (60")                | 150                                      | 5.0                                       | 9         | 1.5              |

| Neck Side mm | Operation Pressure Range (pa) |
|--------------|-------------------------------|
| 150 x 150    | 15pa to 35pa                  |
| 300 x 300    | 15pa to 60pa                  |
| 600 x 600    | 25pa to 75pa                  |
| 1200 x 1200  | 25pa to 95pa                  |

\*Leakage Information based on pressure differential of 250pa

| PRD<br>Table 1      | Air flow range (l/s) for 500mm nominal width |     |                     |     |                     |     |                     |      |                     |      |                     |      |                     |      |
|---------------------|----------------------------------------------|-----|---------------------|-----|---------------------|-----|---------------------|------|---------------------|------|---------------------|------|---------------------|------|
|                     | $\Delta P$<br>=15Pa                          |     | $\Delta P$<br>=25Pa |     | $\Delta P$<br>=35Pa |     | $\Delta P$<br>=45Pa |      | $\Delta P$<br>=55Pa |      | $\Delta P$<br>=65Pa |      | $\Delta P$<br>=75Pa |      |
|                     | Min                                          | Max | Min                 | Max | Min                 | Max | Min                 | Max  | Min                 | Max  | Min                 | Max  | Min                 | Max  |
| Nominal height (mm) |                                              |     |                     |     |                     |     |                     |      |                     |      |                     |      |                     |      |
| 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<br>Table 2            | Air flow range (l/s) for 750mm nominal width |     |                     |      |                     |      |                     |      |                     |      |                     |      |                     |      |
|---------------------------|----------------------------------------------|-----|---------------------|------|---------------------|------|---------------------|------|---------------------|------|---------------------|------|---------------------|------|
| Nominal<br>height<br>(mm) | $\Delta P$<br>=15Pa                          |     | $\Delta P$<br>=25Pa |      | $\Delta P$<br>=35Pa |      | $\Delta P$<br>=45Pa |      | $\Delta P$<br>=55Pa |      | $\Delta P$<br>=65Pa |      | $\Delta P$<br>=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<br>Table 3            | Air flow range (l/s) for 1000mm nominal width |      |                     |      |                     |      |                     |      |                     |      |                     |      |                     |      |
|---------------------------|-----------------------------------------------|------|---------------------|------|---------------------|------|---------------------|------|---------------------|------|---------------------|------|---------------------|------|
| Nominal<br>height<br>(mm) | $\Delta P$<br>=15Pa                           |      | $\Delta P$<br>=25Pa |      | $\Delta P$<br>=35Pa |      | $\Delta P$<br>=45Pa |      | $\Delta P$<br>=55Pa |      | $\Delta P$<br>=65Pa |      | $\Delta P$<br>=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 |

## TYPE OF JONITS

SLIP JOINT



ANGLE JOINT



TDC JOINT



NO JOINT



1 SIDE JOINT 1 SIDE NO JOINT



FLANGE JOINT





**(Wall Mounted)**

Product Code

**PRD (WM)**

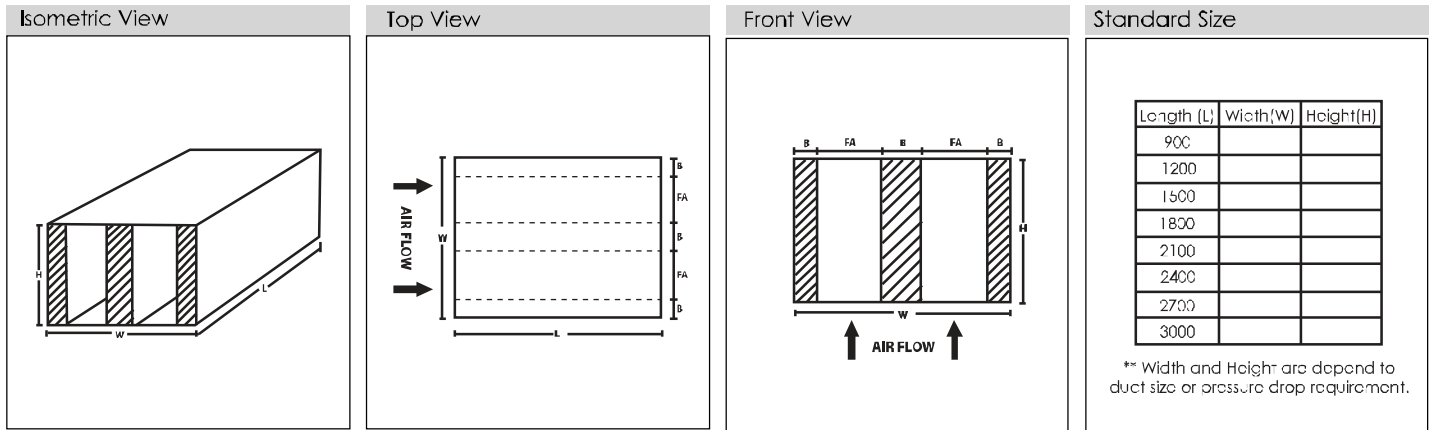
| Stainless Steel 304/316<br>(Standard Type) |                                                                                                                                                                                                                                         |                |                |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|
| Blade<br>Frame                             | 0.6mm<br>0.6mm                                                                                                                                                                                                                          | 1.0mm<br>1.2mm | 0.6mm<br>0.6mm |
| Shaft                                      | <div>Ø8mm Round Shaft<br/>with power Coating</div> <div>Ø7.5mm AL Round Pipe</div> <div>Ø8mm Round Shaft</div>                                                                                                                          |                |                |
| Counter-<br>balance                        | Mild Steel Round Shaft Ø25mm x 38mm<br>(0.128gm) with powder coating                                                                                                                                                                    |                |                |
| Features                                   | <div>Single blade design</div> <div>White powder coated (RAL 9010)</div> <div>(other colours powder coating<br/>are upon request)</div> <div>Counterweight to control inlet<br/>pressure and located rear centre<br/>of the blade</div> |                |                |
| Product<br>Detail                          | <div><b>Minimum Size</b></div> <div>150mm(W) x 150mm(H)</div> <div>(neck size)</div> <div><b>Maximum Size</b></div> <div>1800mm x 1800mm</div> <div>(neck size)</div>                                                                   |                |                |



Product Code

S

|                              |                                                                                              |       |
|------------------------------|----------------------------------------------------------------------------------------------|-------|
|                              |                                                                                              |       |
| Outer Casing Construction    | 1.2mm                                                                                        | 1.2mm |
| Internal Lining Construction | 0.6mm                                                                                        |       |
| Perforated Hole              | 3mm                                                                                          |       |
| Sound Absorbing Material     | Fiberglass                                                                                   |       |
| Type of Connection           | Both Side TDC Joint<br>Both Side Flange Joint                                                |       |
| Type of Silencer             | Rectangular Type<br>Square Type<br>Round Type W/O Center Pod<br>Elbow Type<br>Crasstalk Type |       |
|                              |                                                                                              |       |



## Performance Data

| Length<br>mm | Face<br>Velocity<br>(m / s) | Pressure<br>Drop<br>(Pa) | Insertion Loss (dB)               |     |     |     |    |    |    |    | Generated Noise Lw (dB)           |     |     |     |    |    |    |    |
|--------------|-----------------------------|--------------------------|-----------------------------------|-----|-----|-----|----|----|----|----|-----------------------------------|-----|-----|-----|----|----|----|----|
|              |                             |                          | Octave Band Center Frequency (hz) |     |     |     |    |    |    |    | Octave Band Centre Frequency (hz) |     |     |     |    |    |    |    |
|              |                             |                          | 63                                | 125 | 250 | 500 | 1K | 2K | 4K | 8K | 63                                | 125 | 250 | 500 | 1K | 2K | 4K | 8K |
| 900          | -12.7                       | 135                      | 2                                 | 7   | 13  | 19  | 19 | 13 | 11 | 10 | 65                                | 61  | 58  | 56  | 55 | 53 | 52 | 49 |
|              | -10.2                       | 87                       | 3                                 | 7   | 13  | 18  | 20 | 14 | 11 | 10 | 61                                | 56  | 55  | 51  | 51 | 49 | 49 | 39 |
|              | -7.6                        | 50                       | 3                                 | 7   | 14  | 19  | 20 | 14 | 12 | 11 | 56                                | 52  | 52  | 48  | 47 | 46 | 40 | 29 |
|              | -5.1                        | 22                       | 4                                 | 6   | 13  | 19  | 20 | 14 | 12 | 11 | 52                                | 49  | 48  | 44  | 39 | 35 | 25 | 23 |
|              | 0                           | 0                        | 4                                 | 6   | 13  | 18  | 20 | 14 | 12 | 11 | -                                 | -   | -   | -   | -  | -  | -  | -  |
|              | 5.1                         | 22                       | 2                                 | 6   | 13  | 18  | 20 | 14 | 12 | 11 | 55                                | 46  | 38  | 36  | 37 | 33 | 24 | 26 |
|              | 7.6                         | 50                       | 3                                 | 6   | 12  | 17  | 20 | 14 | 12 | 11 | 60                                | 53  | 44  | 40  | 43 | 46 | 40 | 33 |
|              | 10.2                        | 87                       | 1                                 | 5   | 12  | 16  | 20 | 14 | 11 | 10 | 68                                | 57  | 50  | 45  | 45 | 52 | 49 | 42 |
| 1200         | 12.7                        | 135                      | 1                                 | 5   | 12  | 16  | 20 | 14 | 11 | 10 | 72                                | 62  | 55  | 51  | 48 | 56 | 58 | 52 |
|              | -12.7                       | 135                      | 2                                 | 8   | 14  | 20  | 21 | 14 | 12 | 11 | 72                                | 63  | 59  | 59  | 58 | 60 | 59 | 53 |
|              | -10.2                       | 87                       | 3                                 | 8   | 14  | 19  | 21 | 15 | 12 | 11 | 69                                | 58  | 56  | 56  | 54 | 56 | 51 | 44 |
|              | -7.6                        | 50                       | 3                                 | 7   | 14  | 19  | 21 | 15 | 13 | 12 | 62                                | 54  | 54  | 53  | 50 | 50 | 42 | 34 |
|              | -5.1                        | 22                       | 4                                 | 7   | 13  | 19  | 21 | 15 | 13 | 12 | 55                                | 51  | 50  | 46  | 41 | 36 | 27 | 28 |
|              | 0                           | 0                        | 4                                 | 7   | 13  | 18  | 21 | 15 | 13 | 12 | -                                 | -   | -   | -   | -  | -  | -  | -  |
|              | 5.1                         | 22                       | 2                                 | 7   | 13  | 18  | 20 | 15 | 13 | 11 | 58                                | 48  | 40  | 37  | 38 | 34 | 25 | 28 |
|              | 7.6                         | 50                       | 3                                 | 6   | 12  | 17  | 20 | 15 | 13 | 11 | 63                                | 55  | 46  | 41  | 45 | 48 | 42 | 35 |
| 1500         | 10.2                        | 87                       | 3                                 | 6   | 12  | 17  | 20 | 15 | 12 | 10 | 70                                | 59  | 51  | 48  | 48 | 55 | 53 | 48 |
|              | 12.7                        | 135                      | 1                                 | 6   | 11  | 16  | 20 | 15 | 12 | 11 | 75                                | 65  | 57  | 53  | 51 | 59 | 60 | 56 |
|              | -12.7                       | 140                      | 5                                 | 12  | 15  | 23  | 26 | 18 | 15 | 14 | 70                                | 60  | 56  | 58  | 58 | 61 | 61 | 55 |
|              | -10.2                       | 95                       | 5                                 | 12  | 15  | 23  | 26 | 18 | 15 | 14 | 65                                | 55  | 51  | 55  | 54 | 58 | 54 | 47 |
|              | -7.6                        | 52                       | 5                                 | 12  | 15  | 23  | 26 | 18 | 15 | 14 | 60                                | 51  | 49  | 51  | 52 | 52 | 45 | 37 |
|              | -5.1                        | 25                       | 5                                 | 12  | 15  | 23  | 26 | 18 | 15 | 14 | 58                                | 50  | 43  | 45  | 44 | 39 | 30 | 29 |
|              | 0                           | 0                        | 5                                 | 11  | 15  | 23  | 26 | 18 | 16 | 14 | -                                 | -   | -   | -   | -  | -  | -  | -  |
|              | 5.1                         | 25                       | 5                                 | 10  | 14  | 22  | 25 | 18 | 15 | 13 | 56                                | 45  | 33  | 32  | 37 | 33 | 25 | 29 |
| 1800         | 7.6                         | 52                       | 5                                 | 10  | 14  | 21  | 25 | 18 | 15 | 13 | 63                                | 50  | 41  | 39  | 45 | 48 | 42 | 35 |
|              | 10.2                        | 95                       | 4                                 | 10  | 13  | 20  | 25 | 18 | 15 | 13 | 67                                | 56  | 48  | 45  | 47 | 54 | 52 | 47 |
|              | 12.7                        | 140                      | 5                                 | 10  | 13  | 20  | 24 | 18 | 15 | 13 | 72                                | 62  | 54  | 51  | 51 | 58 | 60 | 56 |
|              | -12.7                       | 150                      | 6                                 | 12  | 21  | 28  | 30 | 18 | 14 | 13 | 69                                | 61  | 59  | 60  | 58 | 61 | 60 | 54 |
|              | -10.2                       | 95                       | 6                                 | 12  | 21  | 27  | 30 | 19 | 15 | 13 | 65                                | 58  | 56  | 57  | 54 | 57 | 53 | 45 |
|              | -7.6                        | 55                       | 6                                 | 12  | 21  | 27  | 29 | 19 | 15 | 14 | 61                                | 55  | 55  | 54  | 51 | 51 | 43 | 35 |
|              | -5.1                        | 25                       | 6                                 | 12  | 20  | 27  | 29 | 19 | 15 | 15 | 57                                | 53  | 51  | 47  | 42 | 37 | 27 | 28 |
|              | 0                           | 0                        | 5                                 | 11  | 20  | 26  | 29 | 19 | 16 | 14 | -                                 | -   | -   | -   | -  | -  | -  | -  |



# PERFORMANCE DATA

| Length<br>mm | Face<br>Velocity<br>(m / s) | Pressure<br>Drop<br>(Pa) | Insertion Loss (dB)               |     |     |     |    |    |    |    | Generated Noise Lw (dB)           |     |     |     |    |    |    |    |
|--------------|-----------------------------|--------------------------|-----------------------------------|-----|-----|-----|----|----|----|----|-----------------------------------|-----|-----|-----|----|----|----|----|
|              |                             |                          | Octave Band Center Frequency (hz) |     |     |     |    |    |    |    | Octave Band Centre Frequency (hz) |     |     |     |    |    |    |    |
|              |                             |                          | 63                                | 125 | 250 | 500 | 1K | 2K | 4K | 8K | 63                                | 125 | 250 | 500 | 1K | 2K | 4K | 8K |
| 2100         | -12.7                       | 150                      | 8                                 | 14  | 24  | 32  | 34 | 19 | 15 | 14 | 68                                | 61  | 58  | 57  | 57 | 61 | 60 | 53 |
|              | -10.2                       | 102                      | 8                                 | 13  | 23  | 31  | 33 | 20 | 16 | 14 | 63                                | 57  | 54  | 55  | 54 | 57 | 53 | 45 |
|              | -7.6                        | 57                       | 9                                 | 13  | 23  | 31  | 33 | 20 | 16 | 15 | 59                                | 53  | 51  | 51  | 51 | 51 | 44 | 35 |
|              | 5.1                         | 27                       | 8                                 | 13  | 22  | 31  | 33 | 21 | 16 | 15 | 57                                | 49  | 46  | 44  | 42 | 37 | 28 | 28 |
|              | 0                           | 0                        | 9                                 | 12  | 22  | 30  | 32 | 20 | 16 | 15 | -                                 | -   | -   | -   | -  | -  | -  | -  |
|              | 5.1                         | 27                       | 7                                 | 11  | 22  | 29  | 32 | 20 | 16 | 14 | 56                                | 44  | 34  | 33  | 36 | 31 | 23 | 28 |
|              | 7.6                         | 57                       | 8                                 | 12  | 20  | 28  | 32 | 21 | 15 | 14 | 61                                | 54  | 43  | 40  | 44 | 46 | 40 | 33 |
|              | 10.2                        | 102                      | 6                                 | 11  | 20  | 27  | 32 | 21 | 15 | 14 | 67                                | 58  | 50  | 47  | 47 | 54 | 52 | 47 |
|              | 12.7                        | 150                      | 6                                 | 11  | 20  | 26  | 31 | 21 | 15 | 13 | 71                                | 63  | 55  | 52  | 50 | 58 | 59 | 55 |
| 2400         | -12.7                       | 150                      | 8                                 | 11  | 20  | 29  | 32 | 20 | 16 | 16 | 68                                | 60  | 59  | 58  | 58 | 59 | 58 | 55 |
|              | -10.2                       | 102                      | 8                                 | 11  | 21  | 29  | 33 | 20 | 16 | 16 | 61                                | 56  | 55  | 55  | 53 | 51 | 48 | 46 |
|              | -7.6                        | 57                       | 9                                 | 12  | 21  | 30  | 34 | 21 | 17 | 16 | 60                                | 53  | 51  | 48  | 48 | 46 | 40 | 38 |
|              | -5.1                        | 27                       | 9                                 | 13  | 22  | 31  | 34 | 21 | 18 | 17 | 58                                | 50  | 48  | 45  | 43 | 39 | 29 | 29 |
|              | 0                           | 0                        | 10                                | 13  | 23  | 31  | 35 | 22 | 18 | 17 | -                                 | -   | -   | -   | -  | -  | -  | -  |
|              | 5.1                         | 27                       | 8                                 | 12  | 23  | 30  | 35 | 22 | 17 | 16 | 57                                | 45  | 35  | 34  | 35 | 33 | 24 | 26 |
|              | 7.6                         | 57                       | 8                                 | 11  | 22  | 30  | 35 | 21 | 17 | 16 | 59                                | 55  | 44  | 40  | 45 | 47 | 42 | 34 |
|              | 10.2                        | 102                      | 7                                 | 11  | 22  | 29  | 35 | 20 | 16 | 16 | 62                                | 58  | 50  | 46  | 48 | 55 | 54 | 48 |
|              | 12.7                        | 150                      | 6                                 | 10  | 21  | 29  | 34 | 20 | 16 | 15 | 66                                | 63  | 56  | 53  | 51 | 59 | 56 | 51 |
| 2700         | -12.7                       | 150                      | 12                                | 15  | 24  | 32  | 35 | 23 | 18 | 16 | 72                                | 68  | 67  | 60  | 58 | 57 | 54 | 53 |
|              | -10.2                       | 102                      | 13                                | 16  | 24  | 32  | 36 | 23 | 18 | 16 | 68                                | 60  | 60  | 58  | 55 | 52 | 54 | 52 |
|              | -7.6                        | 57                       | 13                                | 17  | 25  | 32  | 36 | 24 | 18 | 17 | 62                                | 56  | 56  | 55  | 52 | 48 | 51 | 48 |
|              | -5.1                        | 27                       | 14                                | 17  | 25  | 33  | 37 | 24 | 19 | 18 | 60                                | 53  | 51  | 48  | 47 | 45 | 43 | 40 |
|              | 0                           | 0                        | 14                                | 17  | 26  | 33  | 38 | 24 | 20 | 18 | -                                 | -   | -   | -   | -  | -  | -  | -  |
|              | 5.1                         | 27                       | 13                                | 15  | 26  | 33  | 37 | 23 | 20 | 17 | 62                                | 52  | 50  | 40  | 38 | 35 | 28 | 24 |
|              | 7.6                         | 57                       | 13                                | 15  | 25  | 31  | 37 | 22 | 20 | 16 | 65                                | 56  | 52  | 43  | 44 | 48 | 44 | 35 |
|              | 10.2                        | 102                      | 12                                | 15  | 25  | 31  | 36 | 22 | 20 | 16 | 66                                | 59  | 54  | 48  | 46 | 52 | 49 | 38 |
|              | 12.7                        | 150                      | 12                                | 16  | 25  | 31  | 36 | 22 | 19 | 16 | 70                                | 63  | 59  | 58  | 53 | 52 | 50 | 42 |
| 3000         | -12.7                       | 150                      | 15                                | 18  | 22  | 34  | 38 | 26 | 19 | 18 | 73                                | 69  | 68  | 61  | 60 | 58 | 56 | 54 |
|              | -10.2                       | 102                      | 15                                | 18  | 22  | 34  | 38 | 26 | 20 | 18 | 69                                | 62  | 61  | 59  | 57 | 49 | 55 | 53 |
|              | -7.6                        | 57                       | 15                                | 19  | 23  | 34  | 39 | 27 | 21 | 18 | 63                                | 57  | 57  | 56  | 54 | 50 | 50 | 49 |
|              | -5.1                        | 27                       | 16                                | 20  | 23  | 35  | 39 | 28 | 21 | 19 | 61                                | 54  | 52  | 50  | 48 | 47 | 44 | 42 |
|              | 0                           | 0                        | 16                                | 20  | 24  | 35  | 40 | 28 | 21 | 19 | -                                 | -   | -   | -   | -  | -  | -  | -  |
|              | 5.1                         | 27                       | 15                                | 20  | 23  | 35  | 40 | 26 | 20 | 19 | 63                                | 53  | 52  | 42  | 39 | 36 | 30 | 26 |
|              | 7.6                         | 57                       | 15                                | 19  | 23  | 34  | 40 | 26 | 19 | 18 | 65                                | 58  | 53  | 44  | 46 | 49 | 45 | 35 |
|              | 10.2                        | 102                      | 14                                | 19  | 22  | 34  | 39 | 26 | 19 | 18 | 67                                | 60  | 55  | 49  | 48 | 53 | 50 | 39 |
|              | 12.7                        | 150                      | 14                                | 19  | 22  | 33  | 39 | 26 | 19 | 17 | 71                                | 64  | 60  | 59  | 55 | 54 | 51 | 43 |

| Self Generated Noise Adjustment Factors* |    |    |    |   |    |    |     |     |                      |   |   |   |   |   |    |    |     |
|------------------------------------------|----|----|----|---|----|----|-----|-----|----------------------|---|---|---|---|---|----|----|-----|
| Lw; Adj-Factor(dB)                       | -9 | -6 | -3 | 0 | +6 | +9 | +12 | +15 | Face Area Square Ft. | 5 | 1 | 2 | 4 | 8 | 16 | 32 | 128 |

|  |                    | Aerodynamic Performance Data             |     |     |     |     |     |      |      |     |      |
|--|--------------------|------------------------------------------|-----|-----|-----|-----|-----|------|------|-----|------|
|  |                    | Face Velocity (m/s) & Pressure Drop (pa) |     |     |     |     |     |      |      |     |      |
|  | Length (mm)        | 2.5                                      | 3.8 | 5.1 | 6.4 | 7.6 | 8.9 | 10.2 | 12.7 | 14  | 15.2 |
|  | Pressure Drop (Pa) |                                          |     |     |     |     |     |      |      |     |      |
|  | 900                | 5                                        | 11  | 20  | 31  | 47  | 64  | 79   | 129  | 156 | 176  |
|  | 1200               | 6                                        | 13  | 22  | 35  | 50  | 68  | 87   | 134  | 162 | 196  |
|  | 1500               | 6                                        | 13  | 22  | 35  | 50  | 68  | 87   | 137  | 165 | 196  |
|  | 1800               | 6                                        | 14  | 25  | 39  | 55  | 74  | 94   | 149  | 180 | 211  |
|  | 2100               | 7                                        | 15  | 27  | 43  | 57  | 78  | 102  | 249  | 180 | 214  |
|  | 2400               | 7                                        | 15  | 27  | 43  | 57  | 78  | 102  | 151  | 183 | 216  |
|  | 2700               | 7                                        | 15  | 27  | 43  | 60  | 81  | 104  | 161  | 195 | 226  |
|  | 3000               | 7                                        | 17  | 30  | 47  | 62  | 85  | 112  | 166  | 201 | 243  |

Round Silencer



Top View



Cross Talk Silencer



Cross Silencer





# SILENCER - DESIGN GUIDELINES

| Design Guidelines for HVAC System Noise in Unoccupied Spaces                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Space                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | RC (N) or NC Level |
| <b>Private residences</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 25-35              |
| <b>Hotel / Motels</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |
| Individual rooms or suites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 25-35              |
| Meeting/banquet rooms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 25-35              |
| Halls, corridors, lobbies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 35-45              |
| Service/support areas                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 35-45              |
| <b>Office Buildings</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |
| Executive and private offices                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 25-35              |
| Conference rooms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 25-35              |
| Teleconference rooms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 25(max)            |
| Open plan offices                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 30-40              |
| Circulation and public lobbies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 40-45              |
| <b>Hospitals and clinics</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |
| Private rooms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 25-35              |
| Wards                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 30-40              |
| Operating rooms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 25-35              |
| Corridors                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 30-40              |
| Public area                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 30-40              |
| <b>Performing Arts Spaces</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |
| Drama theaters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 25(max)            |
| Concert and recital halls                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | b                  |
| Music teaching studios                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 25(max)            |
| Music practice rooms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 35(max)            |
| <b>Laboratories (with fume hoods)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |
| Testing / research, minimal speech communication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 45-55              |
| Research, extensive telephone use, speech communication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 40-50              |
| Group teaching                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 35-45              |
| <b>Churches, mosques, synagogues</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 25-35              |
| With critical music programs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | b                  |
| <b>Schools</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |
| Classrooms up to 750 ft <sup>2</sup> [75 m <sup>2</sup> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 40(max)            |
| Classrooms over 750 ft <sup>2</sup> [75 m <sup>2</sup> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 35(max)            |
| Lecture rooms for more than 50 (unamplified speech)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 35(max)            |
| <b>Libraries</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 30-40              |
| <b>Courtrooms</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |
| Unamplified speech                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 25-35              |
| Amplified speech                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 30-40              |
| <b>Indoor stadiums and gymnasiums</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |
| School and college gymnasiums and natatoriums                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 40-50 <sup>C</sup> |
| Large seating capacity spaces (with amplified speech)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 45-55 <sup>C</sup> |
| <p>A) An experienced acoustical consultant should be retained for guidance on acoustically critical spaces (below RC 30) and for all performing arts spaces.</p> <p>B) The values and ranges are based on judgement and experience, not on quantitative evaluations of human reactions.<br/>They be based on a careful analysis of economics, space usage, and user needs.<br/>They are not intended to serve by themselves as a basis.</p> <p>C) Spectrum levels and sound quality are of lesser importance in these spaces than overall sound levels.</p> |                    |

## Silencer Selection Form

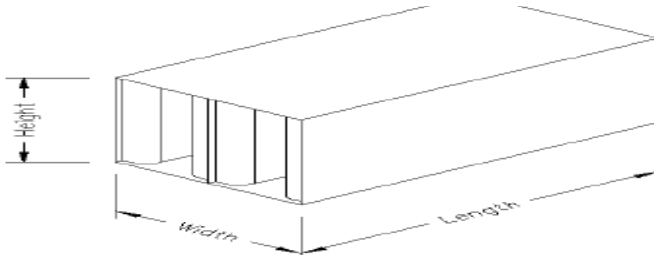
|             |                                                 |                                   |  |  |                                        |  |  |  |  |
|-------------|-------------------------------------------------|-----------------------------------|--|--|----------------------------------------|--|--|--|--|
|             |                                                 | PROJECT INFORMATION               |  |  |                                        |  |  |  |  |
|             |                                                 | Project : .....<br>Client : ..... |  |  |                                        |  |  |  |  |
| FAF<br>DATA | Equipment Details : .....                       |                                   |  |  | Room Surface : ..... Average .....     |  |  |  |  |
|             | External Static Pressure : ..... W.G / PA ..... |                                   |  |  | AHU Area : .....                       |  |  |  |  |
|             | Flow Rate / Capacity : ..... CFM .....          |                                   |  |  | Duct Size : ..... x mm ( x inch) ..... |  |  |  |  |

| Item                                                                  | Description                              | Octave Band Centre Frequency (Hz) |     |     |     |    |    |    |    | Remark / Reference              |
|-----------------------------------------------------------------------|------------------------------------------|-----------------------------------|-----|-----|-----|----|----|----|----|---------------------------------|
|                                                                       |                                          | 63                                | 125 | 250 | 500 | 1k | 2k | 4k | 8k |                                 |
| A                                                                     | FAN Sound Power                          |                                   |     |     |     |    |    |    |    |                                 |
| B                                                                     | Duct System Effects                      |                                   |     |     |     |    |    |    |    |                                 |
| B.1                                                                   | Branch Power Level Division              |                                   |     |     |     |    |    |    |    |                                 |
| B.2                                                                   | Ductwork Attenuation                     |                                   |     |     |     |    |    |    |    |                                 |
|                                                                       | Unlined Rectangular Duct                 |                                   |     |     |     |    |    |    |    |                                 |
|                                                                       |                                          |                                   |     |     |     |    |    |    |    |                                 |
|                                                                       |                                          |                                   |     |     |     |    |    |    |    |                                 |
| B.3                                                                   | Branch Duct Elbow and Tee Loss           |                                   |     |     |     |    |    |    |    |                                 |
| C                                                                     | End Reflection Factor                    |                                   |     |     |     |    |    |    |    |                                 |
| D                                                                     | Environmental Adjustment Factor          |                                   |     |     |     |    |    |    |    |                                 |
| E                                                                     | Lp Sound Pressure Level Leave the System |                                   |     |     |     |    |    |    |    |                                 |
|                                                                       |                                          |                                   |     |     |     |    |    |    |    |                                 |
| E.1                                                                   | Direct Sound Fields                      |                                   |     |     |     |    |    |    |    |                                 |
|                                                                       | Room Surface Characteristic (AVERAGE)    |                                   |     |     |     |    |    |    |    |                                 |
| E.2                                                                   | Reverberant Sound Distance 3m            |                                   |     |     |     |    |    |    |    |                                 |
|                                                                       |                                          |                                   |     |     |     |    |    |    |    |                                 |
| F                                                                     | Safety Factor                            |                                   |     |     |     |    |    |    |    |                                 |
|                                                                       |                                          |                                   |     |     |     |    |    |    |    |                                 |
|                                                                       | Total Resultant Sound, LP, DB            |                                   |     |     |     |    |    |    |    | DBA / NC                        |
|                                                                       | Design Criteria NC                       |                                   |     |     |     |    |    |    |    |                                 |
|                                                                       | Attenuation Requirement                  |                                   |     |     |     |    |    |    |    |                                 |
|                                                                       | Silencer Attenuation Elements, Model     |                                   |     |     |     |    |    |    |    | VENTROX SILENER CATALOGUE MODEL |
|                                                                       | Sound After Attenuation                  |                                   |     |     |     |    |    |    |    | dBa / NC                        |
|                                                                       |                                          |                                   |     |     |     |    |    |    |    |                                 |
| Note : The Selected Silencer is able to meet design criteria of NC 45 |                                          |                                   |     |     |     |    |    |    |    |                                 |

|                                                                               |                                                                                 |
|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Model : RUSKIN SILENCER : .....<br>Dimension : ..... (W) X (H) X (L) MM ..... | Face Velocity : ..... FPM / m/s .....<br>Pressure Drop : ..... In.wg / PA ..... |
|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------|





Product Code

**VAV**

| Outer Frames Construction          | 1.0mm                                                                                                                                                                                   | 0.8mm |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Damper Blade Construction          | 0.8mm                                                                                                                                                                                   |       |
| Damper Gasket Construction         | Silicon Material 1.5mm Thickness                                                                                                                                                        |       |
| Damper Shaft Construction          | 9mm Hexagon Shaft<br>Self-lubricate PQ Nylon Bearing                                                                                                                                    |       |
| Lining Material (Standard Type)    | PF form Insulation Material : 18mm Thickness                                                                                                                                            |       |
| Fibreglass Material                | 2" 2 IBS Thickness                                                                                                                                                                      |       |
| Airflow Sensor                     | Aluminium Tube Ø10mm (OD)                                                                                                                                                               |       |
| Accessories                        | Multiple Outlet<br>Multiple Inlet<br>Multiple Airflow Sensor<br>Reheat Coil                                                                                                             |       |
| Type of Connection (Standard Type) | Round Inlet / Square Outlet<br>Round Inlet / Round Outlet<br>Square Inlet / Square Outlet<br>(Optional Construction)<br>Square Inlet / Multiple Outlet<br>Round Inlet / Multiple Outlet |       |
| Option Material (Stainless Steel)  | Outer Frame Size 0.6mm thickness<br>Damper Blade Size 0.6mm thickness                                                                                                                   |       |
| Option Material (Aluminium)        | Outer Frame Size 1.0mm thickness<br>Damper Blade Size 0.8mm thickness                                                                                                                   |       |

The purpose of variable air volume (VAV) control is to regulate the air flow to a specific zone to maintain the dry bulb temperature for a desired level of occupant comfort. There are variations of this concept that include reheat, dual duct and fan induction applications. Pressure independent control involves an additional input to the control of the VAV terminal unit.

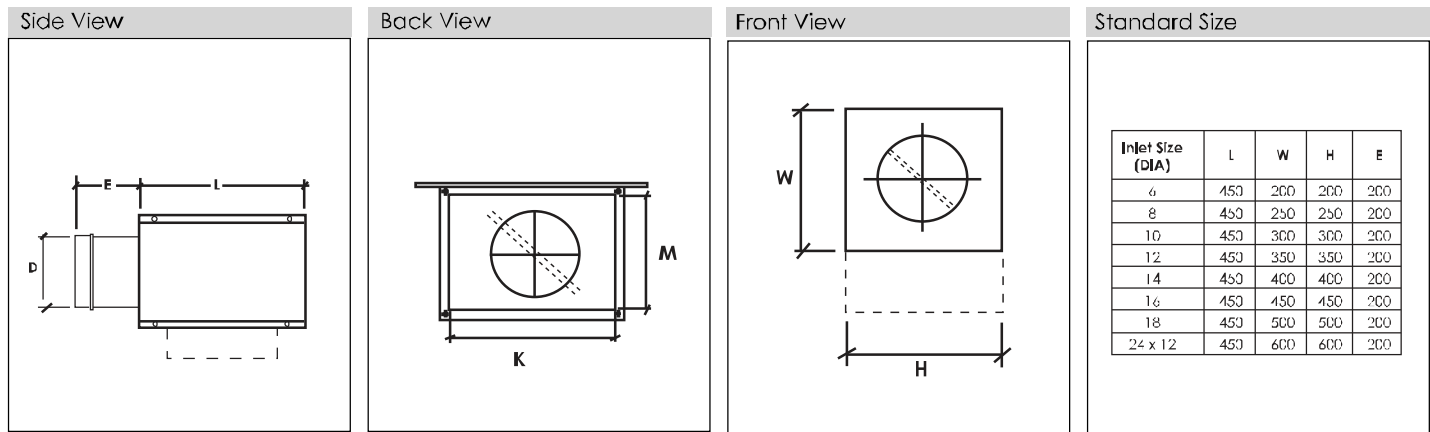
The pressure independent control options also monitor and respond to the velocity of the air flow, generally at the inlet of the unit.

The terminal unit damper is positioned from a signal sent from the zone thermostat through a velocity reset controller to the damper actuator.

The velocity reset controller then responds to changes in the inlet pressure conditions to maintain the required air flow.

Pressure independent controls are frequently used for single duct variable volume control.

For a given thermostat setting the controller can position the damper further open if the air flow at the inlet is insufficient to meet the requirement or it can position the damper further closed if the inlet air flow is greater than the requirement.



| DISCHARGE SOUND DATA |         |      |      |               |       |                             |     |     |      |      |      |    |       |                             |     |      |      |      |    |       |     |                             |      |      |      |    |  |  |    |
|----------------------|---------|------|------|---------------|-------|-----------------------------|-----|-----|------|------|------|----|-------|-----------------------------|-----|------|------|------|----|-------|-----|-----------------------------|------|------|------|----|--|--|----|
|                      |         |      |      |               |       | 1"▲Ps                       |     |     |      |      |      |    | 2"▲Ps |                             |     |      |      |      |    | 4"▲Ps |     |                             |      |      |      |    |  |  |    |
| Inlet size           | Airflow |      |      | Pressure Drop |       | Octave Band Sound Power, LW |     |     |      |      |      |    | LP    | Octave Band Sound Power, LW |     |      |      |      |    |       | LP  | Octave Band Sound Power, LW |      |      |      |    |  |  | LP |
|                      | CFM     | CMH  | L/S  | In.Wg         | PA    | 125                         | 250 | 500 | 1000 | 2000 | 4000 | NC | 125   | 250                         | 500 | 1000 | 2000 | 4000 | NC | 125   | 250 | 500                         | 1000 | 2000 | 4000 | NC |  |  |    |
| 6                    | 40      | 68   | 19   | 0.005         | 1.25  | 43                          | 35  | 24  | 22   | 18   | 14   | -  | 46    | 40                          | 28  | 25   | 22   | 20   | -  | 46    | 45  | 40                          | 32   | 30   | 26   | -  |  |  |    |
|                      | 245     | 416  | 116  | 0.034         | 8.50  | 53                          | 47  | 39  | 35   | 32   | 27   | -  | 56    | 52                          | 43  | 39   | 36   | 33   | -  | 56    | 54  | 51                          | 43   | 40   | 36   | 25 |  |  |    |
|                      | 368     | 625  | 174  | 0.089         | 22.25 | 58                          | 53  | 47  | 42   | 39   | 34   | 22 | 61    | 58                          | 51  | 45   | 43   | 40   | 27 | 60    | 58  | 55                          | 47   | 44   | 40   | 30 |  |  |    |
|                      | 490     | 832  | 231  | 0.169         | 42.25 | 61                          | 57  | 52  | 47   | 43   | 39   | 26 | 64    | 62                          | 56  | 50   | 47   | 44   | 32 | 63    | 61  | 58                          | 51   | 47   | 44   | 33 |  |  |    |
| 8                    | 80      | 135  | 38   | 0.005         | 1.25  | 43                          | 39  | 33  | 27   | 25   | 19   | -  | 46    | 45                          | 40  | 32   | 30   | 26   | -  | 41    | 41  | 23                          | 23   | 24   | 20   | -  |  |  |    |
|                      | 437     | 743  | 206  | 0.040         | 10.00 | 53                          | 49  | 44  | 38   | 35   | 29   | -  | 56    | 54                          | 51  | 43   | 40   | 36   | 25 | 54    | 50  | 43                          | 38   | 37   | 32   | -  |  |  |    |
|                      | 655     | 1113 | 309  | 0.093         | 23.25 | 57                          | 52  | 48  | 42   | 39   | 34   | 22 | 60    | 58                          | 55  | 47   | 44   | 40   | 30 | 60    | 54  | 52                          | 45   | 43   | 38   | 26 |  |  |    |
|                      | 873     | 1483 | 412  | 0.173         | 43.25 | 60                          | 55  | 51  | 46   | 42   | 37   | 26 | 63    | 61                          | 58  | 51   | 47   | 44   | 33 | 64    | 57  | 58                          | 50   | 47   | 41   | 32 |  |  |    |
| 10                   | 130     | 220  | 61   | 0.005         | 1.25  | 35                          | 35  | 20  | 19   | 16   | 9    | -  | 41    | 41                          | 23  | 23   | 24   | 20   | -  | 45    | 50  | 35                          | 29   | 28   | 24   | -  |  |  |    |
|                      | 682     | 1159 | 322  | 0.038         | 9.50  | 48                          | 44  | 39  | 34   | 29   | 21   | -  | 54    | 50                          | 43  | 38   | 37   | 32   | -  | 56    | 55  | 48                          | 43   | 41   | 35   | 23 |  |  |    |
|                      | 1023    | 1738 | 483  | 0.096         | 24.00 | 54                          | 48  | 48  | 41   | 35   | 26   | 22 | 60    | 54                          | 52  | 45   | 43   | 38   | 26 | 60    | 57  | 54                          | 48   | 47   | 40   | 28 |  |  |    |
|                      | 1363    | 2315 | 643  | 0.169         | 42.25 | 58                          | 51  | 54  | 45   | 39   | 30   | 29 | 64    | 57                          | 58  | 50   | 47   | 41   | 32 | 63    | 59  | 57                          | 52   | 50   | 44   | 32 |  |  |    |
| 12                   | 190     | 322  | 90   | 0.005         | 1.25  | 40                          | 45  | 30  | 25   | 23   | 18   | -  | 45    | 50                          | 35  | 29   | 28   | 24   | -  | 41    | 42  | 26                          | 30   | 29   | 29   | -  |  |  |    |
|                      | 983     | 1670 | 464  | 0.039         | 9.75  | 51                          | 50  | 43  | 39   | 36   | 30   | -  | 56    | 55                          | 48  | 43   | 41   | 35   | 23 | 54    | 52  | 43                          | 42   | 41   | 39   | 20 |  |  |    |
|                      | 1474    | 2505 | 696  | 0.094         | 23.50 | 56                          | 52  | 49  | 44   | 42   | 35   | 23 | 60    | 57                          | 54  | 48   | 47   | 40   | 28 | 59    | 56  | 51                          | 47   | 46   | 43   | 25 |  |  |    |
|                      | 1965    | 3338 | 927  | 0.166         | 41.50 | 59                          | 54  | 53  | 48   | 46   | 38   | 27 | 63    | 59                          | 57  | 52   | 50   | 44   | 32 | 63    | 59  | 55                          | 50   | 49   | 46   | 30 |  |  |    |
| 14                   | 260     | 441  | 123  | 0.005         | 1.25  | 36                          | 37  | 23  | 26   | 25   | 25   | -  | 41    | 42                          | 26  | 30   | 29   | 29   | -  | 44    | 44  | 36                          | 36   | 37   | 33   | -  |  |  |    |
|                      | 1337    | 2272 | 631  | 0.043         | 10.75 | 49                          | 47  | 40  | 38   | 37   | 35   | -  | 54    | 52                          | 43  | 42   | 41   | 39   | 20 | 57    | 54  | 50                          | 47   | 46   | 41   | 24 |  |  |    |
|                      | 2005    | 3407 | 946  | 0.102         | 25.50 | 55                          | 51  | 48  | 43   | 43   | 39   | 22 | 59    | 56                          | 51  | 47   | 46   | 43   | 25 | 63    | 59  | 55                          | 52   | 50   | 45   | 30 |  |  |    |
|                      | 2673    | 4541 | 1261 | 0.178         | 44.50 | 58                          | 53  | 52  | 47   | 46   | 41   | 27 | 63    | 59                          | 55  | 50   | 49   | 46   | 30 | 66    | 62  | 59                          | 55   | 53   | 47   | 34 |  |  |    |
| 16                   | 340     | 577  | 160  | 0.005         | 1.25  | 39                          | 38  | 31  | 31   | 30   | 25   | -  | 44    | 44                          | 36  | 36   | 37   | 33   | -  | 42    | 41  | 37                          | 36   | 35   | 34   | -  |  |  |    |
|                      | 1745    | 2965 | 824  | 0.040         | 10.00 | 52                          | 49  | 45  | 42   | 39   | 33   | -  | 57    | 54                          | 50  | 47   | 46   | 41   | 24 | 56    | 52  | 49                          | 46   | 42   | 40   | 23 |  |  |    |
|                      | 2618    | 4449 | 1235 | 0.095         | 23.75 | 58                          | 53  | 50  | 47   | 43   | 37   | 25 | 63    | 59                          | 55  | 52   | 50   | 45   | 30 | 64    | 60  | 56                          | 53   | 51   | 46   | 31 |  |  |    |
|                      | 3490    | 5929 | 1647 | 0.171         | 42.75 | 62                          | 56  | 54  | 50   | 46   | 39   | 29 | 66    | 62                          | 59  | 55   | 53   | 47   | 34 | 68    | 63  | 60                          | 56   | 53   | 47   | 35 |  |  |    |
| 18                   | 440     | 747  | 208  | 0.005         | 1.25  | 42                          | 39  | 33  | 32   | 31   | 26   | -  | 42    | 41                          | 37  | 36   | 35   | 34   | -  | 53    | 54  | 47                          | 45   | 43   | 39   | -  |  |  |    |
|                      | 2209    | 3754 | 1042 | 0.039         | 9.75  | 50                          | 47  | 44  | 41   | 38   | 34   | -  | 56    | 52                          | 49  | 46   | 42   | 40   | 23 | 63    | 61  | 58                          | 52   | 53   | 52   | -  |  |  |    |
|                      | 3314    | 5631 | 1564 | 0.097         | 24.25 | 59                          | 54  | 51  | 48   | 44   | 39   | 26 | 64    | 60                          | 56  | 53   | 51   | 46   | 31 | 68    | 64  | 62                          | 56   | 57   | 56   | 38 |  |  |    |
|                      | 4418    | 7506 | 2085 | 0.176         | 44.00 | 64                          | 58  | 52  | 49   | 47   | 40   | 30 | 68    | 63                          | 60  | 56   | 53   | 47   | 35 | 70    | 66  | 66                          | 64   | 58   | 55   | 41 |  |  |    |
| 24 X 12              | 580     | 985  | 274  | 0.005         | 1.25  | 50                          | 52  | 43  | 41   | 42   | 41   | -  | 53    | 54                          | 47  | 45   | 43   | 39   | -  | 68    | 64  | 62                          | 56   | 57   | 56   | -  |  |  |    |
|                      | 2917    | 4957 | 1377 | 0.043         | 10.75 | 59                          | 58  | 54  | 50   | 51   | 50   | -  | 63    | 61                          | 58  | 52   | 53   | 52   | -  | 70    | 66  | 66                          | 64   | 58   | 55   | -  |  |  |    |
|                      | 4375    | 7434 | 2065 | 0.098         | 24.50 | 64                          | 61  | 59  | 54   | 55   | 54   | 34 | 68    | 64                          | 62  | 56   | 57   | 56   | 38 | 77    | 74  | 69                          | 65   | 58   | 55   | 38 |  |  |    |
|                      | 5833    | 9995 | 2753 | 0.188         | 47.00 | 67                          | 63  | 62  | 56   | 58   | 57   | 37 | 70    | 66                          | 66  | 64   | 58   | 55   | 41 | 89    | 80  | 79                          | 75   | 70   | 69   | 40 |  |  |    |



# PERFORMANCE DATA

| RADIATED SOUND DATA |         |               |       |                             |     |      |      |      |    |     |     |                             |      |      |      |    |     |     |     |                             |      |      |    |    |    |  |  |
|---------------------|---------|---------------|-------|-----------------------------|-----|------|------|------|----|-----|-----|-----------------------------|------|------|------|----|-----|-----|-----|-----------------------------|------|------|----|----|----|--|--|
|                     |         |               |       |                             | ▲   |      |      |      |    |     |     | ▲                           |      |      |      |    |     |     | ▲   |                             |      |      |    |    |    |  |  |
| Inlet size          | Airflow | Pressure Drop |       | Octave Band Sound Power, LW |     |      |      |      |    |     |     | Octave Band Sound Power, LW |      |      |      |    |     |     |     | Octave Band Sound Power, LW |      |      |    |    |    |  |  |
|                     |         |               |       | 250                         | 500 | 1000 | 2000 | 4000 | NC | 125 | 250 | 500                         | 1000 | 2000 | 4000 | NC | 125 | 250 | 500 | 1000                        | 2000 | 4000 |    |    |    |  |  |
|                     |         |               | 0.005 | 1.25                        | 43  | 35   | 24   | 22   | 18 | 14  | -   | 46                          | 40   | 28   | 25   | 22 | 20  | -   | 46  | 45                          | 40   | 32   | 30 | 26 | -  |  |  |
|                     |         |               | 0.034 | 8.50                        | 53  | 47   | 39   | 35   | 32 | 27  | -   | 56                          | 52   | 43   | 39   | 36 | 33  | -   | 56  | 54                          | 51   | 43   | 40 | 36 | 25 |  |  |
|                     |         |               | 0.089 | 22.25                       | 58  | 53   | 47   | 42   | 39 | 34  | 22  | 61                          | 58   | 51   | 45   | 43 | 40  | 27  | 60  | 58                          | 55   | 47   | 44 | 40 | 30 |  |  |
|                     |         |               | 0.169 | 42.25                       | 61  | 39   | 52   | 47   | 43 | 39  | 26  | 64                          | 62   | 56   | 50   | 47 | 44  | 32  | 63  | 61                          | 58   | 51   | 47 | 44 | 33 |  |  |
|                     |         |               | 0.005 | 1.25                        | 43  | 39   | 33   | 27   | 25 | 19  | -   | 46                          | 45   | 40   | 32   | 30 | 26  | -   | 41  | 41                          | 23   | 23   | 24 | 20 | -  |  |  |
|                     |         |               | 0.040 | 10.00                       | 53  | 49   | 44   | 38   | 35 | 29  | 2   | 56                          | 54   | 51   | 43   | 40 | 36  | 25  | 54  | 50                          | 43   | 38   | 37 | 32 | -  |  |  |
|                     |         |               | 0.090 | 23.25                       | 57  | 52   | 48   | 42   | 39 | 34  | 22  | 60                          | 58   | 55   | 47   | 44 | 40  | 30  | 60  | 54                          | 52   | 45   | 43 | 38 | 26 |  |  |
|                     |         |               | 0.173 | 43.25                       | 60  | 55   | 51   | 46   | 42 | 37  | 26  | 63                          | 61   | 58   | 51   | 47 | 44  | 33  | 64  | 57                          | 58   | 50   | 47 | 41 | 32 |  |  |
|                     |         |               | 0.005 | 1.25                        | 35  | 35   | 20   | 19   | 16 | 9   | -   | 41                          | 45   | 23   | 23   | 24 | 20  | -   | 45  | 50                          | 35   | 29   | 28 | 24 | -  |  |  |
|                     |         |               | 0.038 | 9.50                        | 48  | 44   | 39   | 34   | 29 | 21  | -   | 54                          | 50   | 43   | 38   | 37 | 32  | -   | 56  | 55                          | 48   | 43   | 41 | 35 | 23 |  |  |
|                     |         |               | 0.096 | 24.00                       | 54  | 48   | 48   | 41   | 35 | 26  | 22  | 60                          | 54   | 52   | 45   | 43 | 38  | 26  | 60  | 57                          | 54   | 48   | 47 | 40 | 28 |  |  |
|                     |         |               | 0.169 | 42.25                       | 40  | 51   | 54   | 45   | 39 | 30  | 29  | 64                          | 57   | 58   | 50   | 47 | 41  | 32  | 63  | 59                          | 57   | 52   | 50 | 44 | 32 |  |  |
|                     |         |               | 0.005 | 1.25                        | 40  | 45   | 30   | 25   | 23 | 19  | -   | 45                          | 50   | 35   | 29   | 28 | 24  | -   | 41  | 42                          | 26   | 30   | 29 | 29 | -  |  |  |
|                     |         |               | 0.039 | 9.75                        | 51  | 50   | 43   | 39   | 36 | 30  | -   | 56                          | 55   | 48   | 43   | 41 | 35  | 23  | 54  | 52                          | 43   | 42   | 41 | 39 | 20 |  |  |
|                     |         |               | 0.094 | 23.50                       | 56  | 52   | 49   | 44   | 42 | 35  | 23  | 60                          | 57   | 54   | 48   | 47 | 40  | 28  | 59  | 56                          | 51   | 47   | 46 | 43 | 25 |  |  |
|                     |         |               | 0.166 | 41.50                       | 59  | 54   | 53   | 48   | 46 | 38  | 27  | 63                          | 59   | 57   | 52   | 50 | 44  | 32  | 63  | 59                          | 55   | 50   | 49 | 46 | 30 |  |  |
|                     |         |               | 0.005 | 1.25                        | 36  | 37   | 23   | 26   | 25 | 25  | -   | 41                          | 42   | 26   | 30   | 29 | 29  | -   | 44  | 44                          | 36   | 36   | 37 | 33 | -  |  |  |
|                     |         |               | 0.043 | 10.75                       | 49  | 47   | 40   | 38   | 37 | 35  | -   | 54                          | 52   | 43   | 42   | 41 | 39  | 20  | 57  | 54                          | 50   | 47   | 46 | 41 | 24 |  |  |
|                     |         |               | 0.102 | 25.50                       | 55  | 51   | 48   | 43   | 43 | 39  | 22  | 59                          | 56   | 51   | 47   | 46 | 43  | 25  | 63  | 59                          | 55   | 52   | 50 | 45 | 30 |  |  |
|                     |         |               | 0.178 | 44.50                       | 58  | 53   | 52   | 47   | 46 | 41  | 27  | 63                          | 59   | 55   | 50   | 49 | 46  | 30  | 66  | 62                          | 59   | 55   | 53 | 47 | 34 |  |  |
|                     |         |               | 0.005 | 1.25                        | 39  | 38   | 31   | 31   | 30 | 25  | -   | 44                          | 44   | 36   | 36   | 37 | 33  | -   | 42  | 41                          | 37   | 36   | 35 | 34 | -  |  |  |
|                     |         |               | 0.040 | 10.00                       | 52  | 49   | 45   | 42   | 39 | 33  | -   | 57                          | 54   | 50   | 47   | 46 | 41  | 24  | 56  | 52                          | 49   | 46   | 42 | 40 | 23 |  |  |
|                     |         |               | 0.095 | 22.75                       | 58  | 53   | 50   | 47   | 43 | 37  | 25  | 63                          | 59   | 55   | 52   | 50 | 45  | 30  | 64  | 60                          | 56   | 53   | 51 | 46 | 31 |  |  |
|                     |         |               | 0.171 | 42.75                       | 62  | 56   | 54   | 50   | 46 | 39  | 29  | 66                          | 62   | 59   | 55   | 53 | 47  | 34  | 68  | 63                          | 60   | 56   | 53 | 47 | 35 |  |  |
|                     |         |               | 0.005 | 1.25                        | 42  | 39   | 33   | 32   | 31 | 26  | -   | 42                          | 41   | 37   | 36   | 35 | 34  | -   | 53  | 54                          | 47   | 45   | 43 | 39 | -  |  |  |
|                     |         |               | 0.039 | 9.75                        | 50  | 47   | 44   | 41   | 38 | 34  | -   | 56                          | 52   | 49   | 46   | 42 | 40  | 23  | 63  | 61                          | 58   | 52   | 53 | 52 | -  |  |  |
|                     |         |               | 0.097 | 24.25                       | 59  | 54   | 51   | 48   | 44 | 39  | 26  | 64                          | 60   | 56   | 53   | 51 | 46  | 31  | 68  | 64                          | 62   | 56   | 57 | 56 | 38 |  |  |
|                     |         |               | 0.176 | 44.00                       | 64  | 52   | 52   | 49   | 47 | 40  | 30  | 68                          | 63   | 60   | 56   | 53 | 47  | 35  | 70  | 66                          | 66   | 64   | 58 | 56 | 41 |  |  |
|                     |         |               | 0.005 | 1.25                        | 50  | 52   | 43   | 41   | 42 | 41  | -   | 53                          | 54   | 47   | 45   | 43 | 39  | -   | 68  | 64                          | 62   | 56   | 57 | 56 | -  |  |  |
|                     |         |               | 0.043 | 10.75                       | 59  | 58   | 54   | 50   | 51 | 50  | -   | 63                          | 61   | 58   | 52   | 53 | 52  | -   | 70  | 66                          | 66   | 64   | 58 | 55 | -  |  |  |
|                     |         |               | 0.098 | 24.50                       | 64  | 61   | 59   | 54   | 55 | 54  | 34  | 68                          | 64   | 62   | 56   | 57 | 56  | 38  | 77  | 74                          | 69   | 65   | 58 | 55 | 38 |  |  |
|                     |         |               | 0.188 | 47.00                       | 67  | 63   | 62   | 56   | 58 | 57  | 37  | 70                          | 66   | 66   | 64   | 58 | 55  | 41  | 89  | 80                          | 79   | 75   | 70 | 69 | 40 |  |  |

## Method of Installation

- \* Avoid abrupt transitions or duct turns at the inlet of the units that would alter the cross section area.
- \* A minimum of three duct diameter of straight duct upstream of inlet sensor is recommended. (i.e 6" inlet dia = 18" or more straight upstream duct, figure 1)
- \* Close coupling the terminal unit inlet to side of the main duct is recommended. Figure 2.
- \* The control unit must be mounted such that the airflow sensor is at the inlet of the terminal unit upstream of the NOT damper blade.

Figure 1

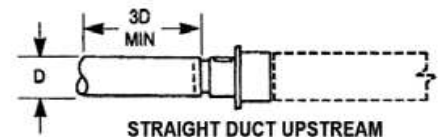
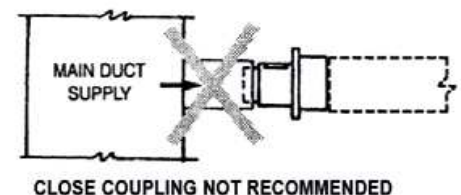


Figure 2



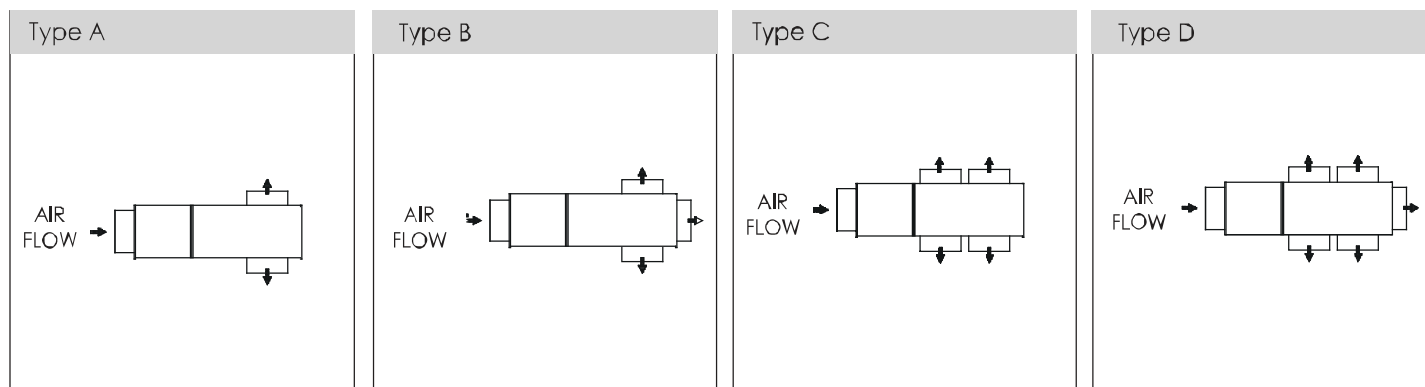
## Installation Guide

## DAMPER & CASE LEAKAGE DATA

| Inlet Size | Airflow CFM (L/S)       |     | Damper Leakage |     |       |     |       |     | Casing Leakage |     |       |     |       |     |
|------------|-------------------------|-----|----------------|-----|-------|-----|-------|-----|----------------|-----|-------|-----|-------|-----|
|            | Min                     | Max | 1" wg          |     | 2" wg |     | 4" wg |     | 1" wg          |     | 2" wg |     | 4" wg |     |
|            |                         |     | CFM            | %   | CFM   | %   | CFM   | %   | CFM            | %   | CFM   | %   | CFM   | %   |
| 6          | 40 - 490 (19 - 230)     |     | 4              | 0.8 | 5     | 1.0 | 7     | 1.3 | 2              | 0.4 | 3     | 0.6 | 5     | 1   |
| 8          | 80 - 873 (38 - 412)     |     | 4              | 0.4 | 5     | 0.5 | 7     | 0.8 | 3              | 0.3 | 4     | 0.4 | 6     | 0.8 |
| 10         | 130 - 1363 (61 - 643)   |     | 4              | 0.3 | 5     | 0.3 | 7     | 0.5 | 4              | 0.3 | 5     | 0.3 | 7     | 0.6 |
| 12         | 190 - 1965 (90 - 927)   |     | 4              | 0.2 | 5     | 0.1 | 7     | 0.3 | 5              | 0.2 | 7     | 0.3 | 9     | 0.5 |
| 14         | 260 - 2673 (123 - 1260) |     | 4              | 0.1 | 6     | 0.1 | 8     | 0.3 | 6              | 0.2 | 9     | 0.3 | 12    | 0.4 |
| 16         | 340 - 3490 (160 - 1647) |     | 5              | 0.1 | 7     | 0.1 | 9     | 0.1 | 7              | 0.2 | 10    | 0.3 | 14    | 0.4 |
| 18         | 440 - 4418 (208 - 2085) |     | 5              | 0.1 | 7     | 0.1 | 9     | 0.1 | 7              | 0.1 | 11    | 0.1 | 16    | 0.3 |
| 24 x 12    | 580 - 5833 (274 - 2753) |     | 5              | 0.1 | 7     | 0.1 | 9     | 0.1 | 7              | 0.1 | 13    | 0.1 | 18    | 0.3 |

| Inlet Size | Airflow CFM ( L/S )     |     | L   | W   | H   | E   | K   | M   |
|------------|-------------------------|-----|-----|-----|-----|-----|-----|-----|
|            | Min                     | Max |     |     |     |     |     |     |
| 6          | 40 - 490 (19 - 231)     |     | 570 | 200 | 200 | 200 | 160 | 160 |
| 8          | 80 - 873 (38 - 412)     |     | 570 | 250 | 250 | 200 | 210 | 210 |
| 10         | 130 - 1363 (61 - 643)   |     | 570 | 300 | 300 | 200 | 260 | 260 |
| 12         | 190 - 1965 (90 - 927)   |     | 570 | 350 | 350 | 200 | 310 | 310 |
| 14         | 260 - 2673 (123 - 1261) |     | 570 | 400 | 400 | 200 | 360 | 360 |
| 16         | 340 - 3490 (160 - 1647) |     | 570 | 450 | 450 | 200 | 410 | 410 |
| 18         | 440 - 4418 (208 - 2085) |     | 570 | 500 | 500 | 200 | 460 | 460 |
| 24 x 12    | 580 - 5833 (274 - 2753) |     | 800 | 600 | 600 | 200 | 560 | 560 |

## Accessory



| Multiple Outlet Type | No of Outlet | Length | Damper |
|----------------------|--------------|--------|--------|
|                      |              | mm     | Dia    |
| A                    | 2            |        |        |
| B                    | 3            |        |        |
| C                    | 4            |        |        |
| D                    | 5            |        |        |

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