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曾 泉 江 鐵 器 廠
CHAN CHUAN CHANG METAL WORKS
BLOCK 5055, ANG MO KIO INDUSTRIAL PARK 2, #01-1141,
SINGAPORE 569558 TEL : 64817736 FAX : 64813517
Email: sales@ccc.com.sg Website: http://www.ccc.com.sg
Reg. No. 204949/00M

# NON-RETURN DAMPERS


## Brand : CCC

## AIR DIFFUSION EQUIPMENT
## NON-RETURN DAMPERS
## Series : CCC-NRD

# CHAN CHUAN CHANG METAL WORKS


## VISION

"To produce high quality products, high standard of creativity in design and excellent credibility in reputation"

## MISSION

"Serve customer with satisfactory and reliable works and products"

Chan Chuan Chang Metal Works was established in 1975, committed to the vision to manufacture good quality Air Diffusion Equipment. After building up its reputation in the industry as a top manufacturer, the company registered the logo with the Registry of Trade and Patents (Singapore). From then onwards, all equipment which has the trade mark symbolise our commitment to serve our customer with satisfactory and reliable works and products.

Our products have been tested by VIPAC, testing laboratory at Victorian technology Centre, Port Melbourne, Victoria. Furthermore, the results are NATA Certified (National Association of Testing Authorities, Australia) to ADC 10623 R3 (Air Diffusion Council, USA) and are officially endorsed in countries which are signatories to the I.L.A.C agreement-namely, Australia, New Zealand, Britain, USA and Malaysia.

We were proud to introduce the **Heavy Duty Aluminium Computer Floor Grille**, Series : CR to the industry in 1991. This has been a breakthrough as the grille are able to provide adequate air flow whilst maintaining the weight of any person or equipment. This is verified by the Comprehensive Loading Test performed by Singapore Institute of Standard & Industrial Research (SISIR), currently known as Spring Singapore. Series : CR has since then been installed in many computer rooms, wafer manufacturing plant and places which require the product.


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Office: +65 6481 7736
Fax: +65 6481 3517
Website: www.ccc.com.sg

## COMPANY MILESTONE

**1975** Established with the vision to manufacture high quality Air Diffusion Equipment to meet future needs and demands. Together with a team of experienced Engineers & Craftsman dedicated to Chan Chuan Chang's Motto – Commitment, Creativity & Credibility, we produced good quality products with high standard of creativity in design and maintained excellent credibility in reputation.

**1982** Registered with the Registry of Trade and Patents (Singapore), CCC Trade Mark has since became a household name in its industry.

**1986** Chan Chuan Chang (CCC) products are tested by VIPAC, a testing laboratory at Victorian Technology Centre, Port Melbourne, Victoria. These results are NATA Certified (National Association of Testing Authorities, Australia) to ADC 10623 R3 (Air Diffusion Council, USA) and are officially endorsed in countries which are signatories to the I.L.A.C agreement – namely, Australia, New Zealand, Britain, USA and Malaysia.

**1991** CCC Aluminium Computer Floor Air Grille was sent for Comprehensive Loading Test conducted by Singapore Institute of Standard & Industrial Research (SISIR) and achieved excellent results.

**1997** CCC was awarded ISO 9002 Certification. Our impressive list of satisfied clients is testimony to CCC's motto – Commitment, Creativity and Credibility.

**2005** CCC has improved its quality management system with respect to the ISO 9001:2000 standard due to our commitment towards quality improvement in our products and customer satisfaction. We thank you for your faith and support in our products. We will continue to strive harder to exceed your demand & satisfaction.

**2012** CCC was awarded ISO 9001:2008 Certification by BVQI Accreditation. CCC also became a certified member of Air Movement and Control Association International (AMCA). Our Low Leakage dampers were tested according to AMCA standards and received certifications.


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## Non-Return Dampers



### Construction

- High quality G.I. steel with flange for duct mounting.
- Standard depth of non-return damper is 6”.
- Standard flange of 32mm.
- Bronze bushes, steel linkages and shafts are used for the moving mechanism.
- Blades are made of 0.7mm to 1.5mm thickness galvanized steel sheet or aluminium sheet depending on the airflow rate.

### Description

- Series NRD is designed to meet the requirement of the construction industry. They are used to prevent backflow of air and relieve pressure through ventilation duct systems.
- No actuators are required. Non-return dampers are operated by the airflow automatically.
- NRD allows protection against unwanted air, rain and birds into the air conditioning system when there are no airflow in the ductings.

### Optional Accessories & Features

- Anti-corrosion coating
- Zinc primer
- Foam gasket
- Flange holes
- Other colour coatings may be available upon request.
- Suggestions are also available on request from your CCC specialist.
- Other materials such as SS304/SS316 are availbe upon request.


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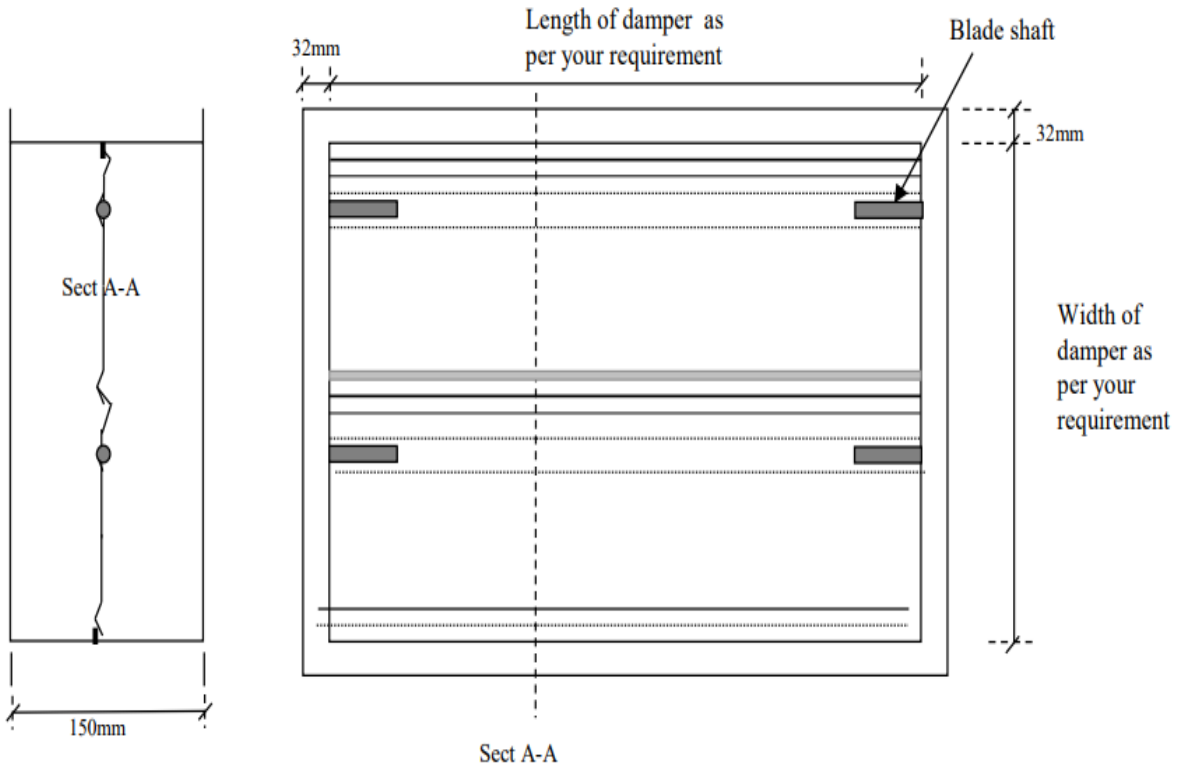
# Non Return Damper / Back Draft Damper
# Model : NRD

## Design Construction




- Standard construction will be of 1mm G.I. sheet for frame and 0.7mm G.I. sheet for blades unless stated by customers.
- Standard flange of 32mm for both sides will be included and depth will be of 150mm for our NRD series.
- Either single or multi blades will be depending on the size of the non-return damper.
- Please do inform us of any specifications that you requires before the manufacturing takes place.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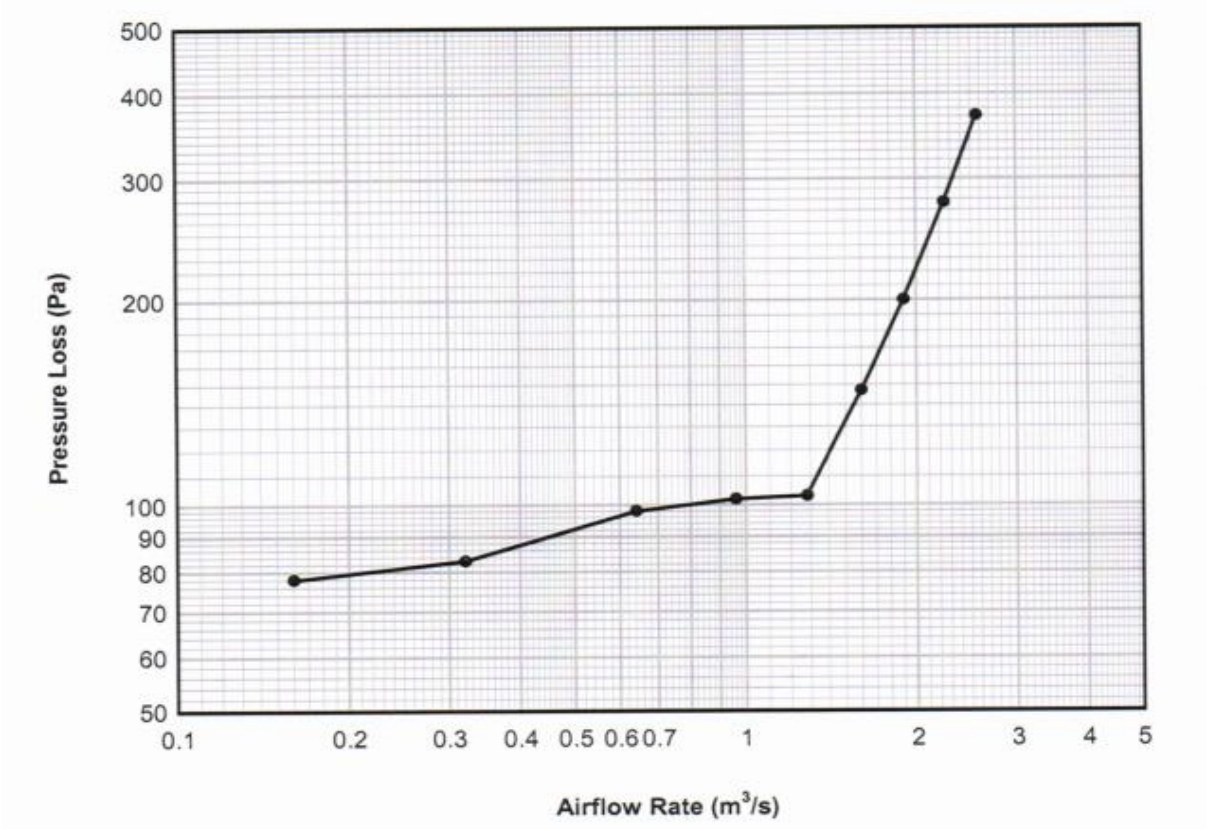
## Test Report for 400mm X 400mm X 150mm NRD series

**Table 1 : Static Pressure Loss of "CCC-NRD 400" Non-Return Damper**

| Damper Flow Rate ($m^3/s$) | 400mm x 400mm x 150mm Non-Return Damper |
|---|---|
| | Static Pressure loss (Pa) |
| 0.12 | 62 |
| 0.16 | 78 |
| 0.32 | 83 |
| 0.64 | 98 |
| 0.96 | 102 |
| 1.28 | 103 |
| 1.60 | 147 |
| 1.92 | 210 |
| 2.24 | 277 |
| 2.56 | 371 |

**Table 1 : Static Pressure Loss of "CCC-NRD 400" Non-Return Damper**





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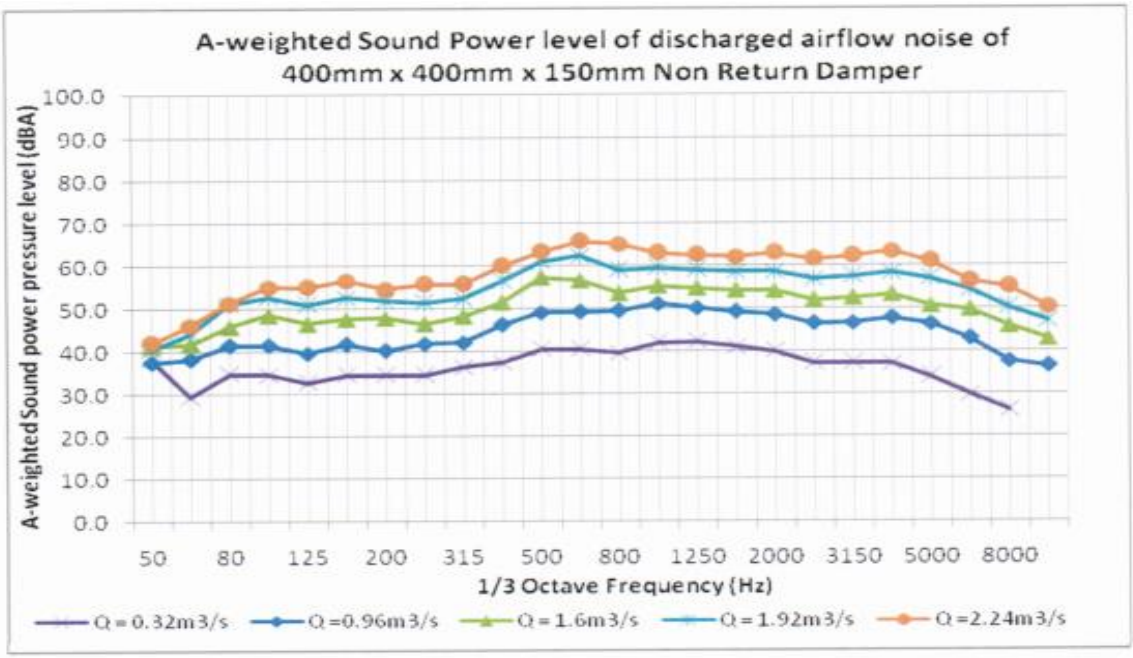
## Test Report for 400mm X 400mm X 150mm NRD series

**Table 2a : Discharged Sound Power Levels of "CCC-NRD 400" Non-Return Damper**

| Frequency (Hz) | Discharged Sound Power Level (dBA) | | | | | |
|---|---|---|---|---|---|---|
| | Volume Flow Rate | | | | | |
| | Q = 0.32m³/s | | Q = 0.96m³/s | | Q = 1.6m³/s | |
| 50 | 38.3 | 40.3 | 37.5 | 44.2 | 41.6 | 48.4 |
| 63 | 29.5 | | 38.3 | | 41.8 | |
| 80 | 34.8 | | 41.5 | | 45.9 | |
| 100 | 34.6 | 38.8 | 41.5 | 45.9 | 48.6 | 52.5 |
| 125 | 32.8 | | 39.7 | | 46.6 | |
| 160 | 34.5 | | 41.8 | | 47.7 | |
| 200 | 34.5 | 40.0 | 40.3 | 46.3 | 47.9 | 52.4 |
| 250 | 34.5 | | 41.9 | | 46.5 | |
| 315 | 36.4 | | 42.2 | | 48.2 | |
| 400 | 37.4 | 44.5 | 46.2 | 53.2 | 51.5 | 60.6 |
| 500 | 40.5 | | 49.2 | | 57.2 | |
| 630 | 40.6 | | 49.3 | | 56.7 | |
| 800 | 39.7 | 46.3 | 49.6 | 55.1 | 53.6 | 59.3 |
| 1000 | 42.1 | | 51.2 | | 55.2 | |
| 1250 | 42.3 | | 50.1 | | 54.7 | |
| 1600 | 41.2 | 44.5 | 49.2 | 53.1 | 54.3 | 58.4 |
| 2000 | 40.0 | | 48.6 | | 54.1 | |
| 2500 | 37.2 | | 46.6 | | 52.1 | |
| 3150 | 37.3 | 41.2 | 46.6 | 51.8 | 52.5 | 57.1 |
| 4000 | 37.2 | | 47.8 | | 53.3 | |
| 5000 | 34.0 | | 46.4 | | 50.7 | |
| 6300 | 29.9 | 34.0 | 43.1 | 44.9 | 49.8 | 51.9 |
| 8000 | 26.1 | | 37.7 | | 45.9 | |
| 10000 | 30.5 | | 36.5 | | 42.9 | |
| Overall A-weighted (dBA) | 51.6 | | 60.1 | | 65.8 | |





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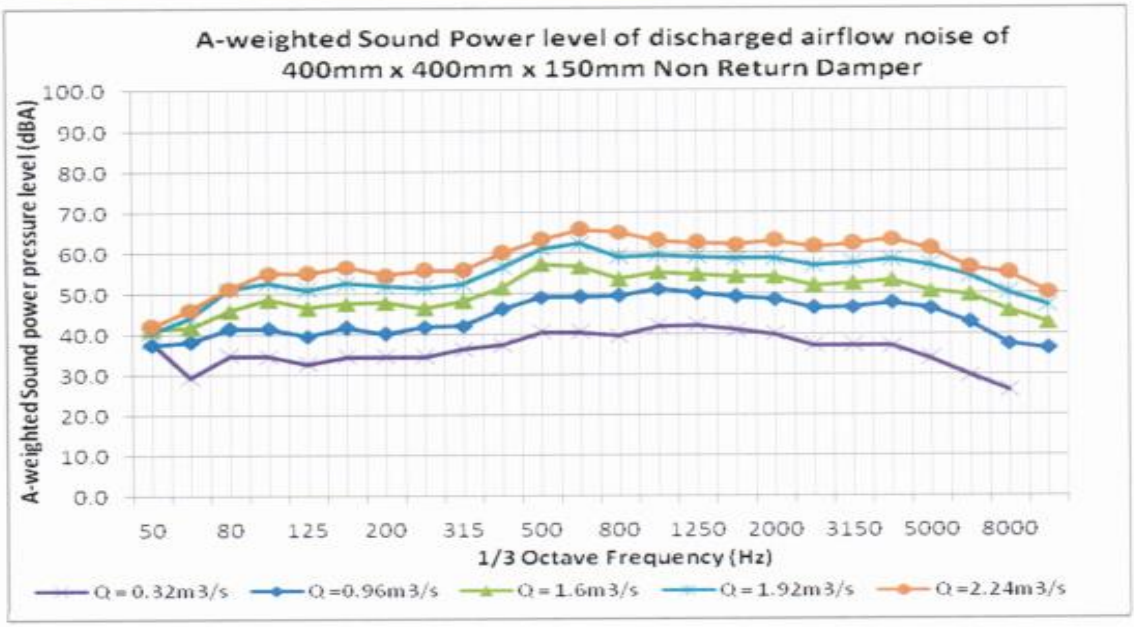
## Test Report for 400mm X 400mm X 150mm NRD series

**Table 2b : Discharged Sound Power Levels of "CCC-NRD 400" Non-Return Damper**

| Frequency (Hz) | Discharged Sound Power Level (dBA) | | | |
|---|---|---|---|---|
| | Volume Flow Rate | | | |
| | Q = 1.92m³/s | | Q = 2.24m³/s | |
| 50 | 40.6 | 52.3 | 42.0 | 52.9 |
| 63 | 44.3 | | 46.2 | |
| 80 | 51.2 | | 51.4 | |
| 100 | 52.7 | 57.0 | 55.2 | 60.5 |
| 125 | 51.0 | | 55.1 | |
| 160 | 52.7 | | 56.7 | |
| 200 | 51.9 | 56.7 | 54.6 | 60.2 |
| 250 | 51.5 | | 55.8 | |
| 315 | 52.4 | | 55.7 | |
| 400 | 56.5 | 65.4 | 60.0 | 68.4 |
| 500 | 61.0 | | 63.3 | |
| 630 | 62.4 | | 65.8 | |
| 800 | 59.0 | 64.0 | 65.2 | 68.5 |
| 1000 | 59.5 | | 63.1 | |
| 1250 | 59.0 | | 62.6 | |
| 1600 | 58.7 | 63.0 | 62.1 | 67.0 |
| 2000 | 58.7 | | 63.0 | |
| 2500 | 56.9 | | 61.5 | |
| 3150 | 57.5 | 62.4 | 62.3 | 67.1 |
| 4000 | 58.4 | | 63.5 | |
| 5000 | 57.0 | | 61.0 | |
| 6300 | 54.5 | 56.4 | 56.4 | 59.3 |
| 8000 | 50.3 | | 55.0 | |
| 10000 | 47.2 | | 50.4 | |
| Overall A-weighted (dBA) | 70.5 | | 74.4 | |





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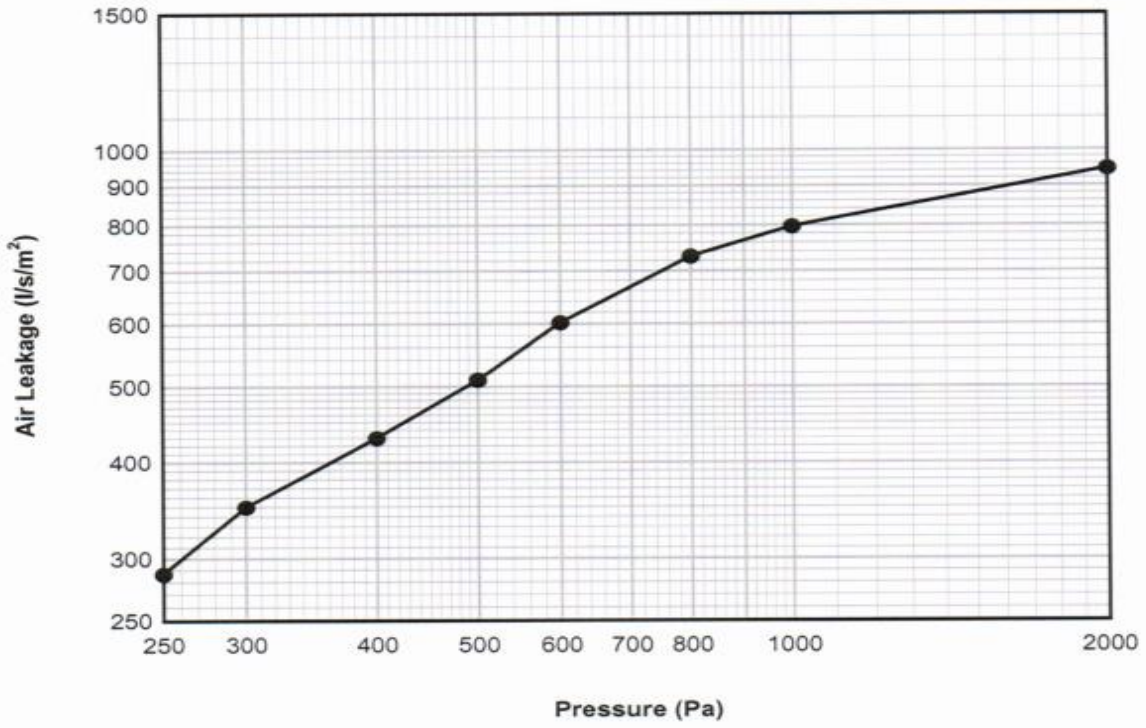
## Test Report for 400mm X 400mm X 150mm NRD series

**Table 3 : Leakage Test of "CCC-NRD 400" Non-Return Damper**

| 400mm x 400mm x 150mm Non Return Damper (Damper blade fully Close) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Supply Pressure (Pa) | 250 | 300 | 400 | 500 | 600 | 800 | 1000 | 2000 |
| Supply flow rate, $Q_S$ (cfm) | 1177 | 1265 | 1482 | 1670 | 1745 | 2008 | 2194 | 3103 |
| Leakage Volume Flow Rate, $Q_F$ (cfm) | 92 | 113 | 131 | 156 | 192 | 233 | 255 | 302 |
| Leakage Volume Flow Rate, $Q_{FL}$ (l/s/m$^2$) | 287 | 354 | 409 | 490 | 602 | 730 | 797 | 946 |
| Percentage of leakage (%) | 8 | 9 | 9 | 9 | 11 | 12 | 12 | 10 |
| *Rated Leakage (%) | 4 | 5 | 6 | 7 | 9 | - | - | - |

Note:

1. Nominal flow rate ,$Q_N$ = 2194 cfm
2. Percentage of leakage (%) = ($Q_F$ / $Q_S$) x 100%
3. *Rate leakage (%) = ($Q_F$ / $Q_N$) x 100%. Maximum Rate Leakage = 10%





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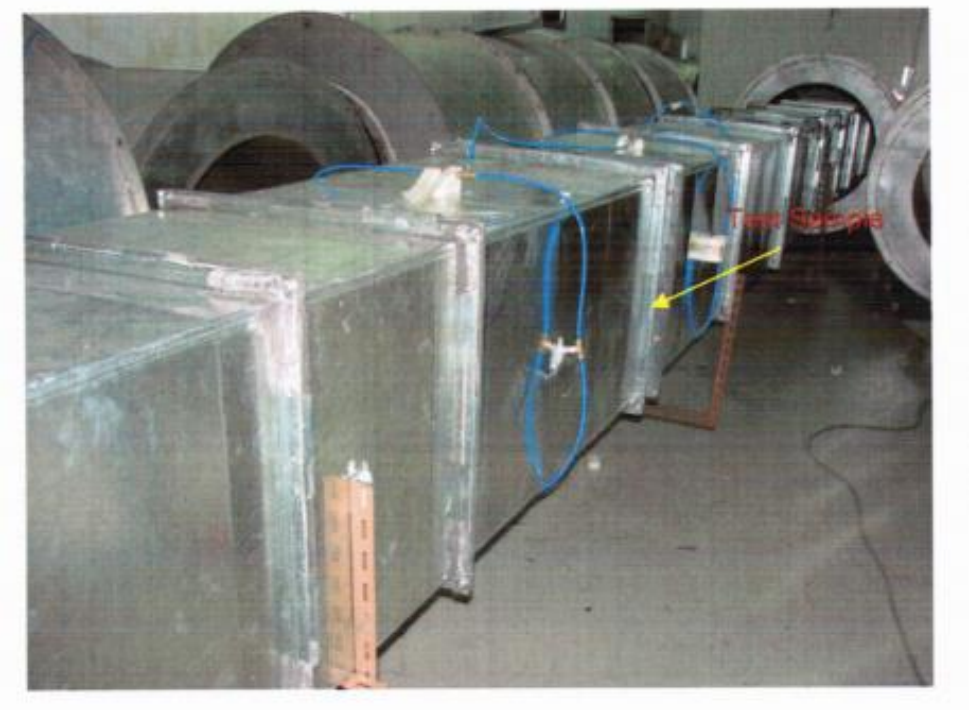
## Testing Methods

**Test setup for the static pressure loss VS airflow rate and discharged sound level test**




**Test setup for Air Leakage Test**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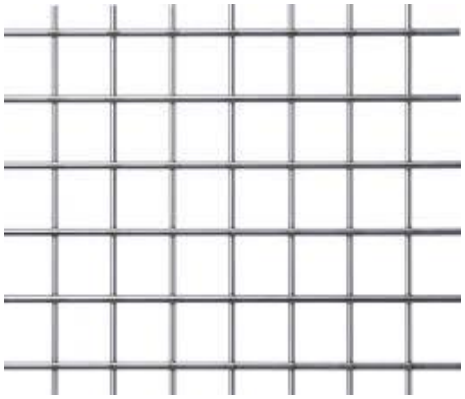
**Optional Accessories/requests for Volume Control Damper**


**FLANGE HOLES** : Pre-Flange holes allows you easier installation and acts as a guide to let you install the damper easily. Please request if you require holes at your flange so we can quote you accordingly for the number of holes.



**Wire Mesh** : Wires mesh is useful for Volume Control Dampers that are used outdoor to keep birds and animlas from going into your unit.

**Foam Gasket** : Foam gasket prevent greater leakage through the connections of VCD to ductings.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