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**CHAN CHUAN CHANG METAL WORKS**

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## SQUARE LOUVRE CEILING DIFFUSER



**Brand : CCC**

**AIR DIFFUSION EQUIPMENT  
SQUARE LOUVRE CEILING DIFFUSER**

**Series : CCC-CD**

## 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.



### 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 become 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.

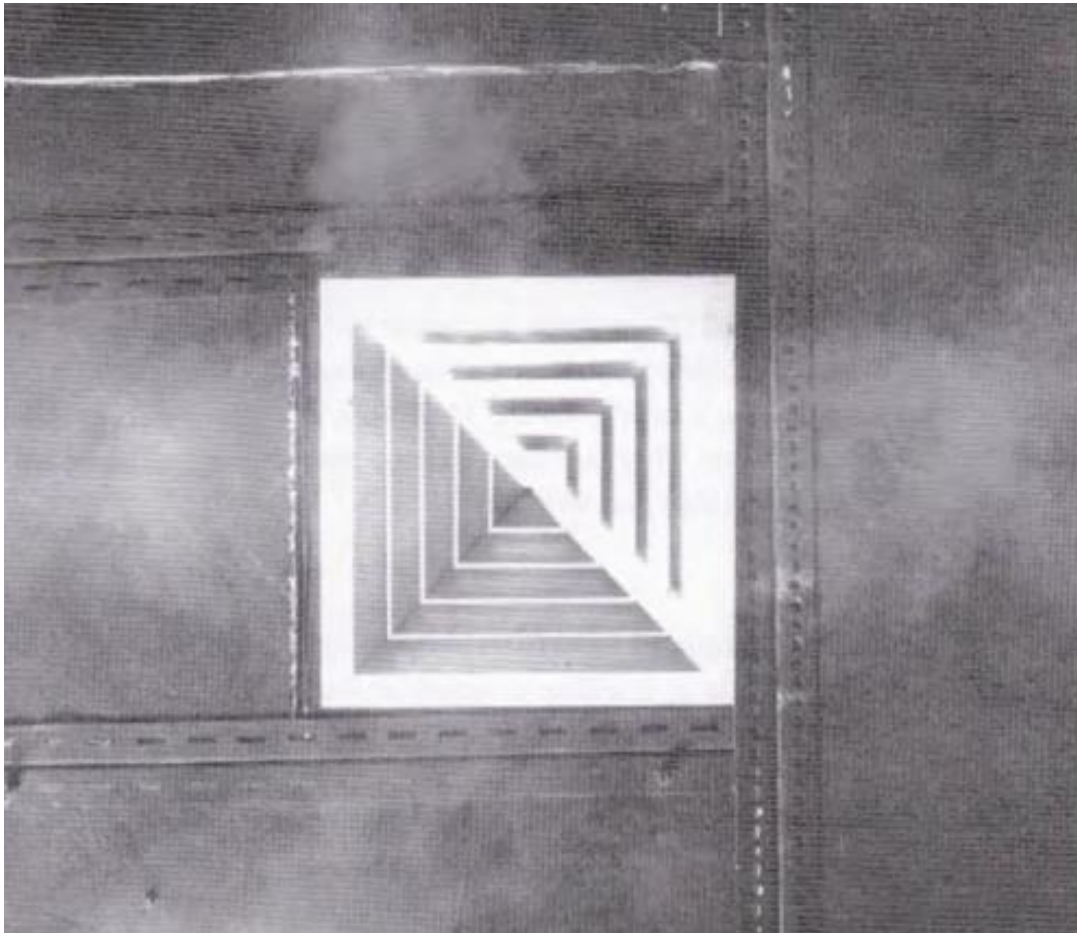
**1991** CCC Aluminium Computer Floor Air Grille was sent for Comprehensive Loading Test conducted by Singapore Institute of Standard & Industrial Research (SISIR) and achieved excellent results.

**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.

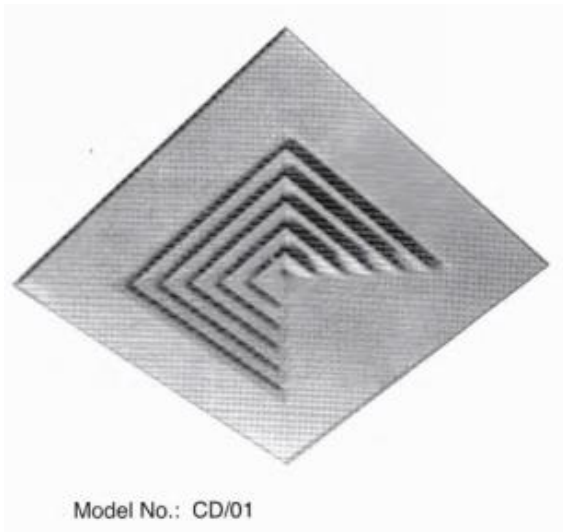
**2012** CCC was awarded ISO 9001:2008 Certification by BVQI Accreditation. CCC also became a certified member of Air Movement and Control Association International (AMCA). Our Low Leakage dampers were tested according to AMCA standards and received certifications.

## Laboratory Testings

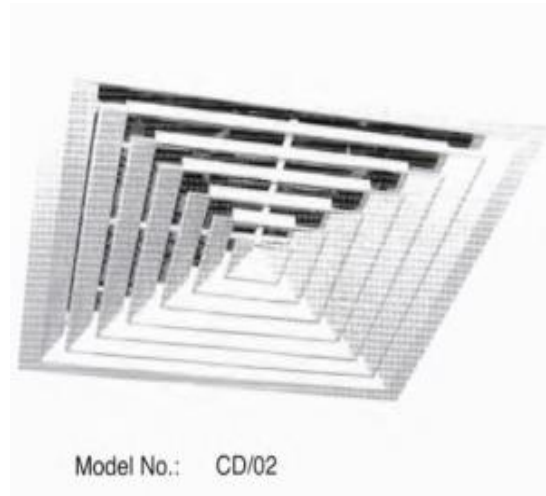


Installed ceiling diffusers in laboratory for testing.

Ceiling is painted black to facilitate witnessing of smoke pattern.



**CCC-CD/01**



**CCC-CD/02**

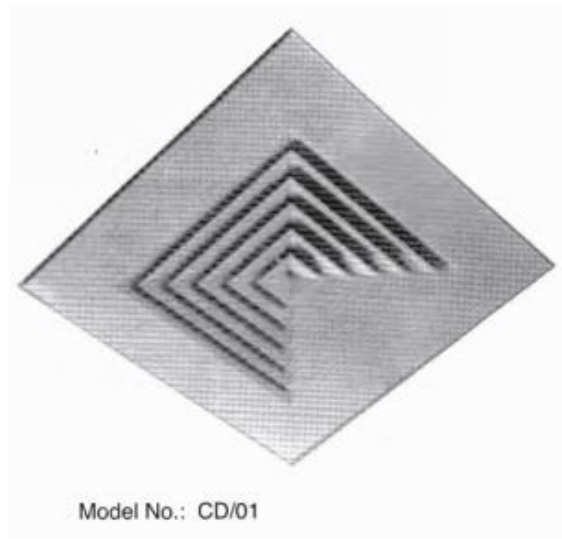
## APPLICATIONS

- General purposes for commercial installations.
- A standardized and popular type of diffuser for most of the commercial installations.
- Installation to be only for ceilings.
- Suitable for places where people are working for long hours.

## FEATURES & DETAILS

- Series CD diffusers are available with different core patterns to ensure maximum design versatility.
- The flow pattern ranges from single way (direction) to 4 ways (direction).
- Diffusers are manufactured from high quality extruded aluminium sections or steel.
- Core sections are easily removable for maintenance.
- CD series offers the best possible air flow characteristic whilst maintain low noise level of operation.

## CCC-CD/01



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*THE STANDARD AND POPULAR CEILING DIFFUSERS TO  
MEET YOUR COMMERCIAL GENERAL PURPOSES*

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**Product Name :** Square Louvre Ceiling Diffuser

**Model :** CCC-CD/01

**Material :** Extruded Aluminium / SS304 / SS316

**Features :**

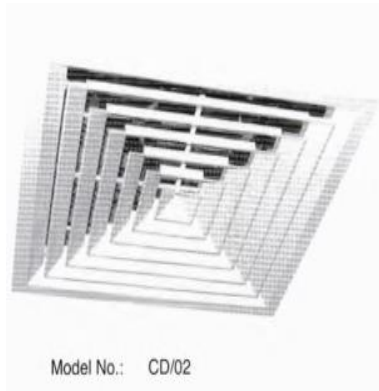
CCC standard diffusers are manufactured from extruded aluminium sections. This model comes with bigger frames to suit your ceiling type. They are available with different core patterns to ensure maximum design versatility. The flow pattern ranges from single way to 4 way directions. The core sections in all units are easily removable for regular maintenance. It is able to offer the best possible airflow characteristics whilst maintaining a low level of noise during operation. Standard finishing will in white powder coating.

**Optional Accessories (chargeable) :**

- Other optional accessories such as Opposed Blade Damper, Fan-Type Damper, Neck Reducers, Quick Mounting Neck Adapters, Plenum Box & adapter Collar are available upon request.
- Materials such as anodized aluminium, SS304 and SS316 are available upon request.
- Other colour finishing may be available upon request.



## CCC-CD/02



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*THE STANDARD AND POPULAR CEILING DIFFUSERS TO  
MEET YOUR COMMERCIAL GENERAL PURPOSES*

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**Product Name :** Square Louvre Ceiling Diffuser

**Model :** CCC-CD/02

**Material :** Extruded Aluminium / SS304 / SS316

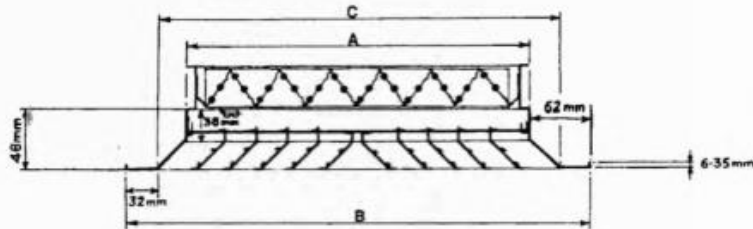
**Features :**

CCC standard diffusers are manufactured from extruded aluminium sections. They are available with different core patterns to ensure maximum design versatility. The flow pattern ranges from single way to 4 way directions. The core sections in all units are easily removable for regular maintenance. It is able to offer the best possible airflow characteristics whilst maintaining a low level of noise during operation. Standard finishing will in white powder coating.

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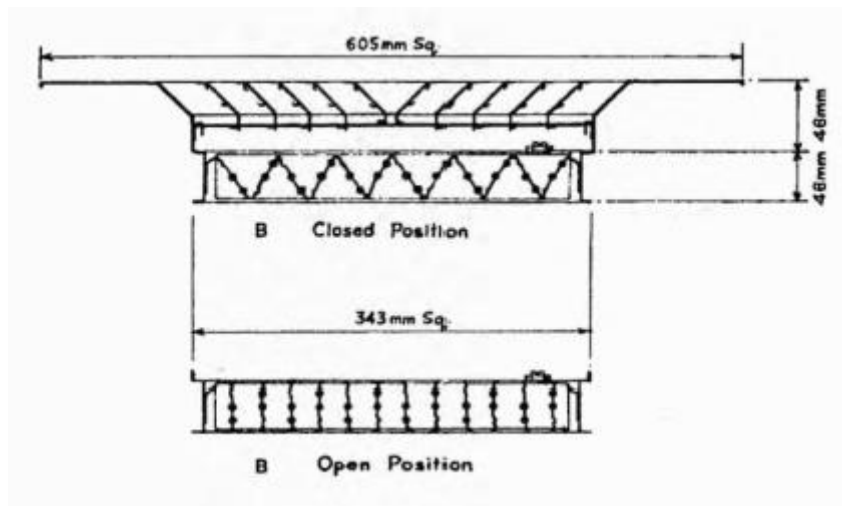
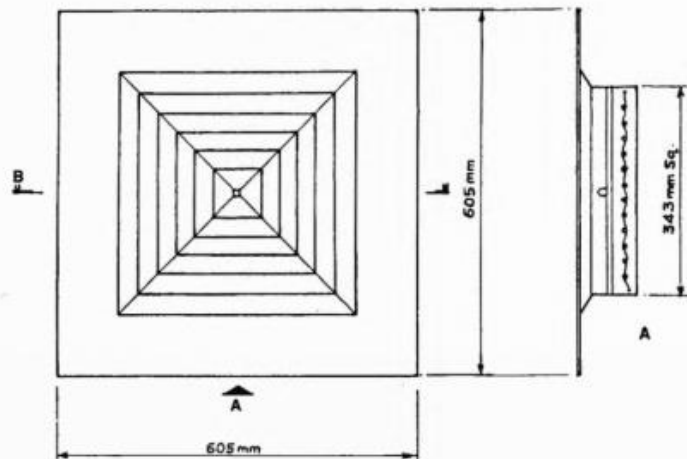
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**Design and Dimensions**



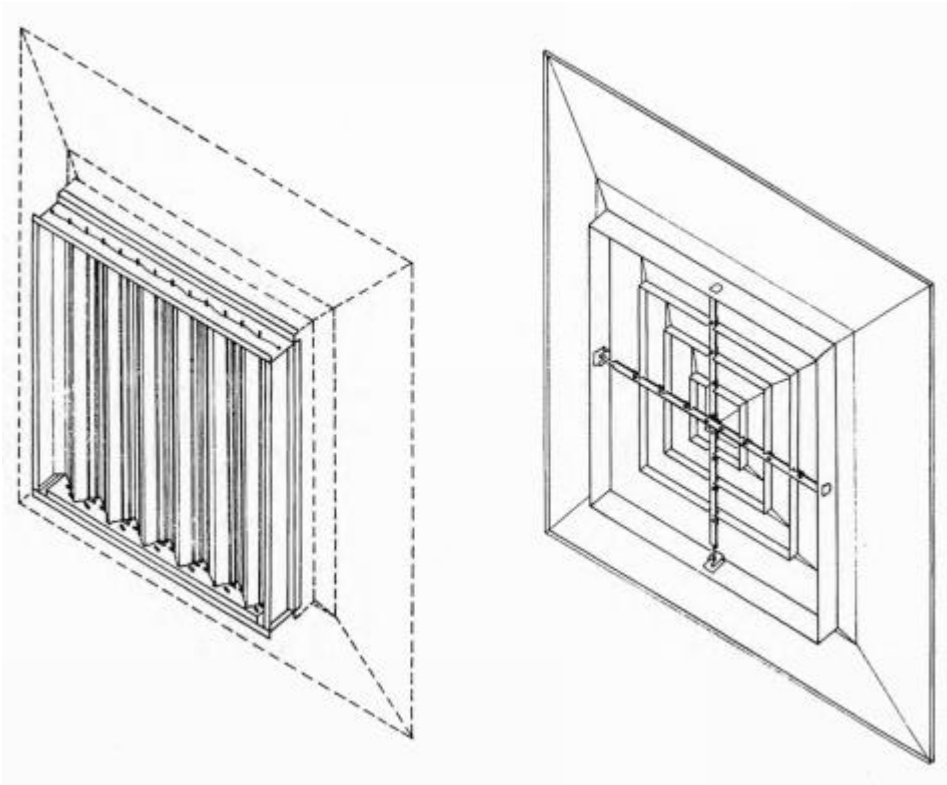
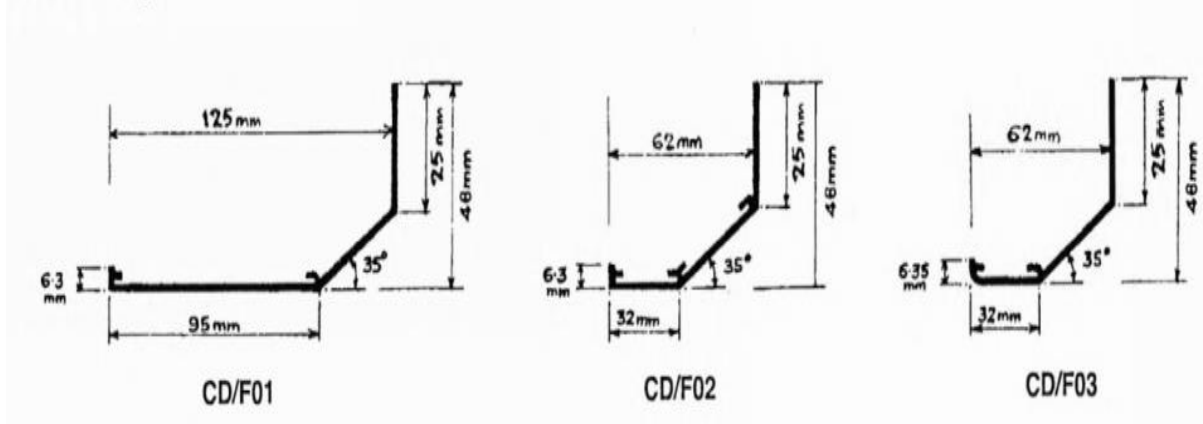
- A = Nominal neck size less 12 mm
- B = Nominal face size
- C = Ceiling opening size or nominal face size less 64 mm

Diffuser Neck Size (mm)	Diffuser Actual Face Size
152	260
203	310
254	362
305	413
356	463
406	514
457	565
508	616
560	667
610	718

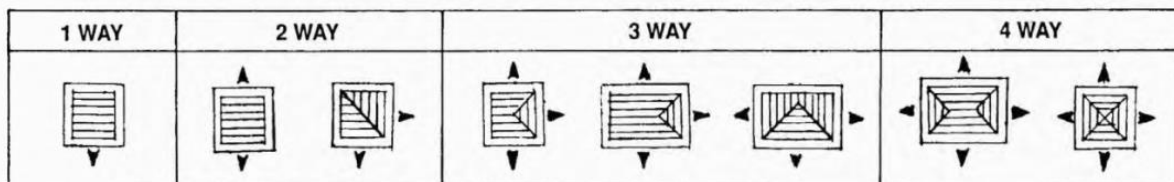




### Frame Style



### TYPE OF DIFFUSION



## SELECTING A SERIES CD DIFFUSER

When selecting a Series CD diffuser, the following requirements has to be considered.

1. The air pattern requirements.
2. The throw requirements.
3. The air quantity.
4. The desired noise levels.

### **1. The Air Pattern Requirement**

The positioning of the outlets and the shape of the area to be conditioned affect the dispersing of the air.

For example, a small office may only require a single small ceiling diffuser to be located in the centre of the room. However a large area, such as a supermarket, library or classroom, may require a large number of diffuser, evenly spaced throughout the area to produce an overlapping movement of air.

Besides lighting fixtures, exposed beams, support columns, office partions and aesthetic considerations may all have a strong bearing on the frame style and core pattern that will meet the specific requirements.

### **2. The Throw Requirement**

The distance from an outlet to the nearest enclosing wall or the distance from a diffuser to the intersection of its airstream with that of a second diffuser, is considered the throw requirement.

For high ceiling applications, the throw is usually measured to extend to the 1500mm level of the room.

The proper throw condition will be achieved, if the following extremes of conditioning do not arise:

- i. Inadequate conditioning which fails to cover the total area.
- ii. Excessive air quantities relative to the capacity and positioning of the diffuser, thus creating drafts.

### **3. The Air Quantity**

The total volume of air to be delivered to each area, is determined by the overall system design. Thus the number of outlets per room, determines the volume to be transmitted through each outlet.

### **4. The Noise Level Specification**

The noise level produced by an outlet relates directly to the quantity of air being transmitted through the outlet, as well as the neck size and core style.

The following table may be used as a guide to the generally acceptable NR levels for various common use situations:

NR LEVELS	TYPICAL APPLICATIONS
20 – 25	Radio, TV, Studios, Churches.
25 - 30	Live Theatres, Opera Halls, Concert Halls, Band Rooms
30 - 35	Conference Rooms, Movie Theatres, Lecture Rooms, Private Offices.
35 - 40	Libraries, General Offices, Laboratories, Restaurants.
40 - 45	Halls, Corridors, Cafeterias.
45 - 50	Storerooms, Large Department Stores and Supermarkets.
Over 50	Manufacturing Areas.

## SELECTING A SERIES CD DIFFUSER

### Air Velocity in a Duct System

Air velocity can be calculated using the following expressions:

$$V = \frac{q}{A}$$

Or

$$V = \frac{q \times 4}{d^2 \times \pi}$$

Where

q = airflow l/s

A = area m<sup>2</sup>

D = diameter m

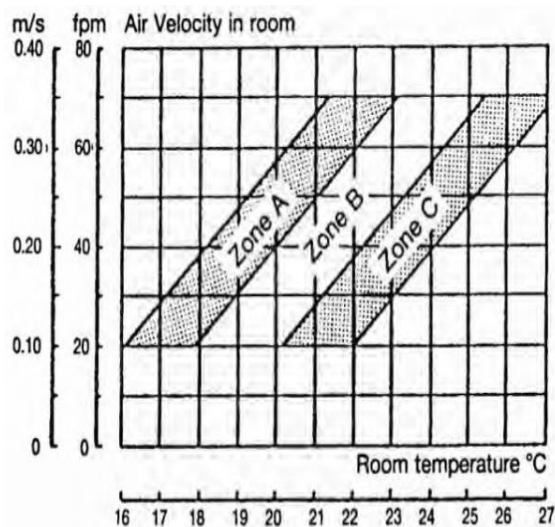
V = air velocity m/s

To convert air velocity expressed in m/s, to fpm use the following formula:

$$V \text{ (fpm)} = 197 \times v \text{ (m/s)}$$

### Recommended Air Velocity in Rooms

It is generally accepted that room air velocities should be limited according to room temperature. The following graphs shows recommended air velocities for different applications.



**Zone A:** Large spaces, people in motion eg. Big department stores, hotel lobbies, indoor sports activities.

**Zone B:** Office space, small shops, schools, public buildings.

**Zone C:** Hospitals, individual hotel rooms, private offices.

Example:

For a room temperature of 20 °C and rooms in Zone B, recommended room air velocities are between 0.10m/s and 0.20m/s (20-40 fpm).

### Calculation of other Terminal Velocities

For a given throw (L<sub>1</sub>) and velocity (V<sub>1</sub>), other throws can be calculated for other terminal velocities (V<sub>2</sub>,L<sub>2</sub>) using the following formula.

(Note: Assuming one stays within a limited zone of the jet core)

$$L_2 = \frac{L_1 \times V_1}{V_2}$$

Example:

For a throw of 4 metres, with a terminal velocity of 0.5m/s, what is the throw with a terminal velocity of 0.3m/s?

$$\begin{aligned} L_2 &= \frac{L_1 \times V_1}{V_2} \\ &= \frac{4 \times 0.5}{0.3} \\ &= 6.7 \text{ metres} \end{aligned}$$

## PERFORMANCE GRAPHS

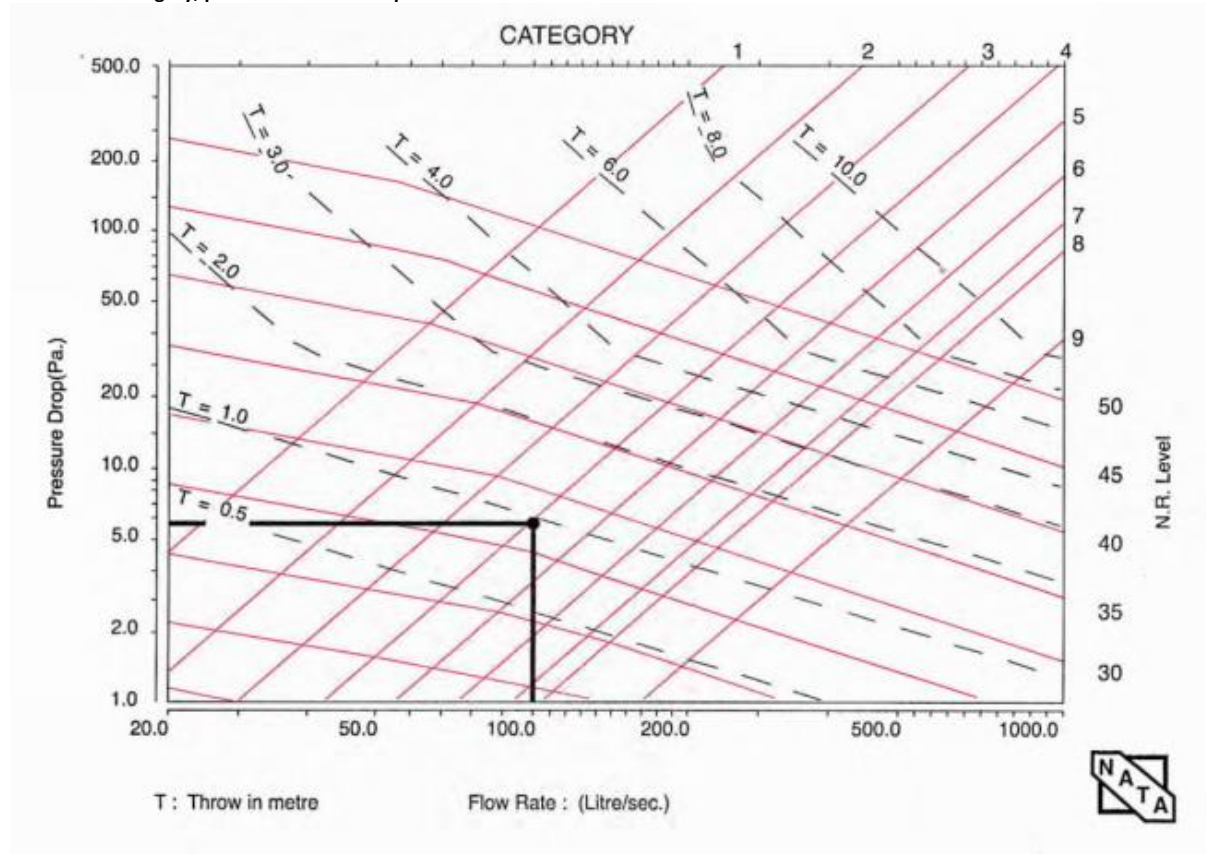
The performance graphs show Airflow, pressure drop sound levels and throws for each size of the product.

The throws are established to a terminal velocity of 0.5m/s (100 fpm) and are in metres. On the performance graphs, there are marked in as dashed lines, with the particular throw value marked on as follows: i.e. T=04

Pressure drops are shown as total pressure in Pascals (Pa).

Sound Levels are presented as Noise Ratings (N.R.) in dB, including a 6 dB room absorption.

Throws are shown to a terminal velocity of 0.5m/s (100 fpm)  
 For diffuser category, please refer to the Aspect Table for the Diffuser Size.



**ASPECT TABLE**

CATEGORY	1	2	3	4	5	6	7	8	9
SQUARE NECK SIZE (MM)	150	200	250	300	350	400	450	480	600

Example:

An airflow of 100 l/s (360 cfm) using a type 4 (300mm square neck size, from Aspect Table) will give a pressure drop of 6pa (0.025inwg), a noise rating of 27, and a throw of 1m, for an air velocity of 0.5 m/s.



## OPTIONAL ACCESSORIES

These are some of our optional accessories for your references:



### Opposed-Blade Damper

To vary and control the supply air volume providing a sustained discharge velocity throughout the volume range.



### Fan-Type Damper

To vary and control the supply air volume providing a sustained discharge velocity throughout the volume range.



### Reflector

To control the direction of the air flow



### Plenum Box

A junction to join various ducts. It is a closed space space inteded to store air and also helps to reduce noise level of the airflow.