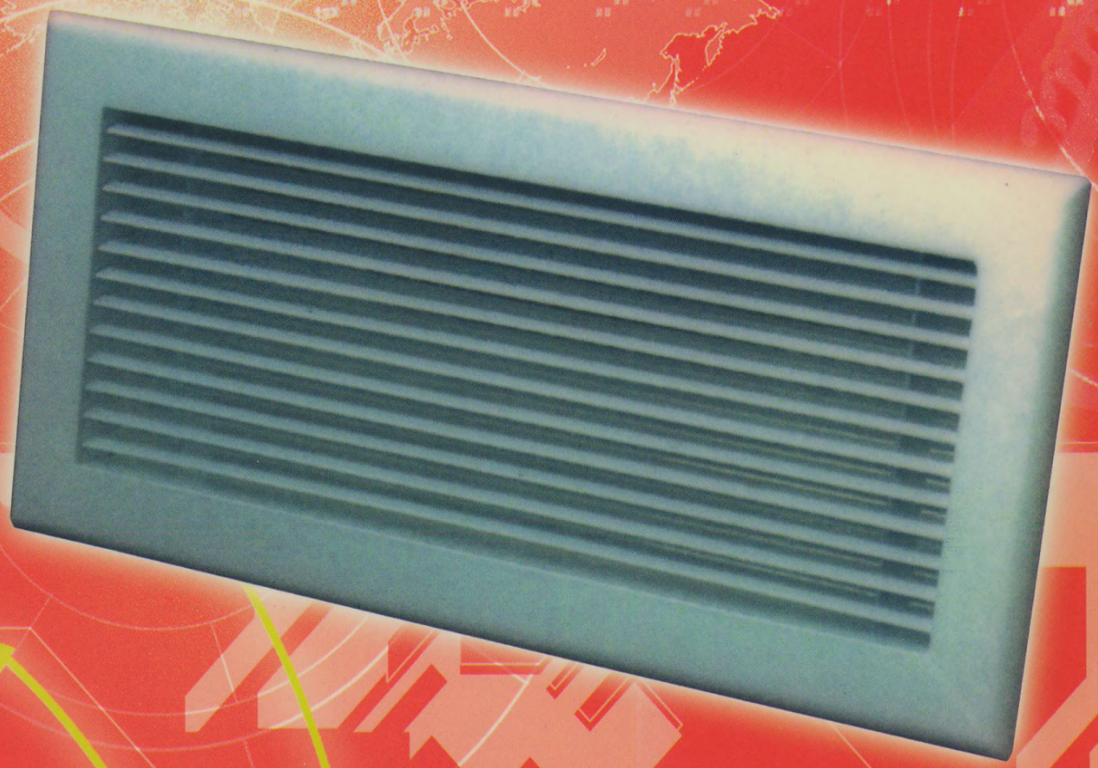
T03/02856C

曾泉江鐵器廠

CHAN CHUAN CHANG METAL WORKS



Brand : CCC

Air Diffusion Equipment

THIN FIN GRILLES

Series: LBMR

GRILLES AND DIFFUSERS ARE TESTED TO NATA STANDARD (AUSTRALIA)

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.

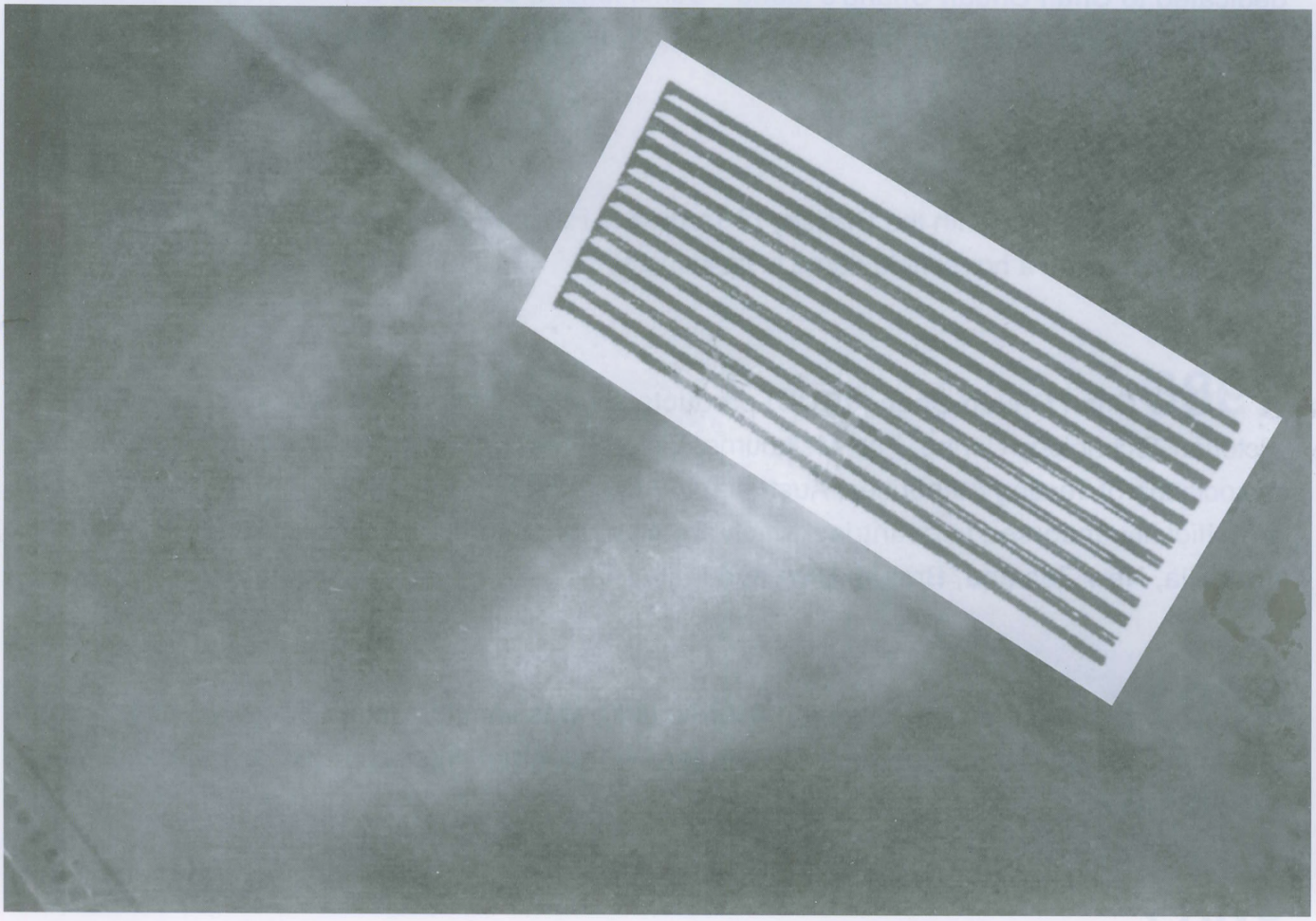
1982 Registered with the Registry of Trade and Patents (Singapore), CCC Trade Mark has since become a household name in its industry.

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.

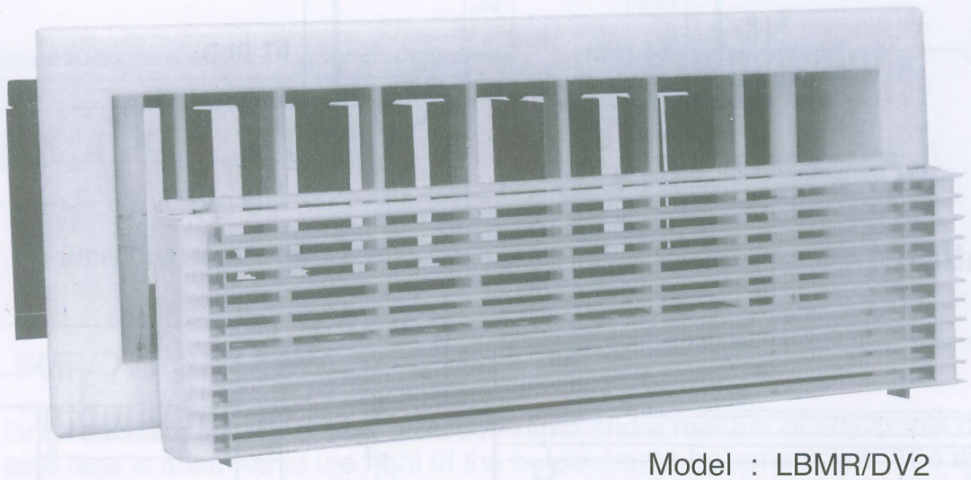
1997 CCC was awarded ISO 9002 Certification. Our impressive list of satisfied clients is testimony to CCC's motto - Commitment, Creativity and Credibility.

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.



Installed Thin Fin Grille in laboratory for testing.
Wall is painted black to facilitate witnessing smoke pattern.

Thin Fin Grilles
Series LBMR



Model : LBMR/DV2

Description

– Series LBMR grilles are specially designed to create an elegant touch to the surrounding architecture.

– Various grille combination have been designed for individual air applications.

– Length of the removable core face ranges from 50mm to 2000 mm. We are also able to cater to specific requirements of lengths greater than 2000mm without any breaks throughout the entire length of the fins.

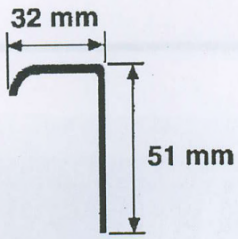
– Colour anodizing and other paint finishes may be available upon request.

Other Features

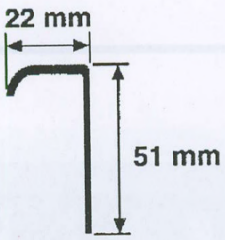
Fixing:

– Suggestions are also available on request from CCC Specialist.

Frame Style

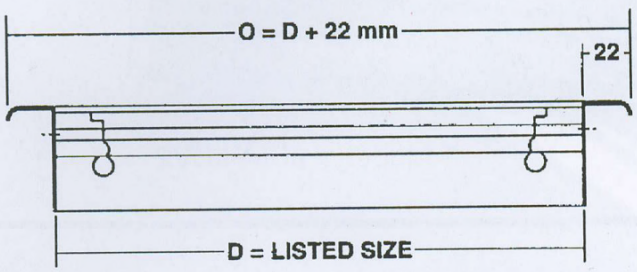


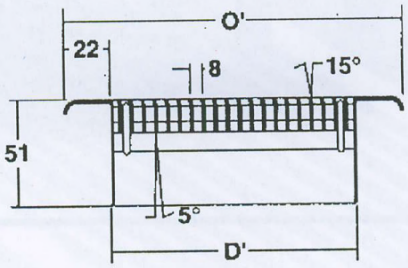
LBMR/F01



LBMR/F02

Grille Combination

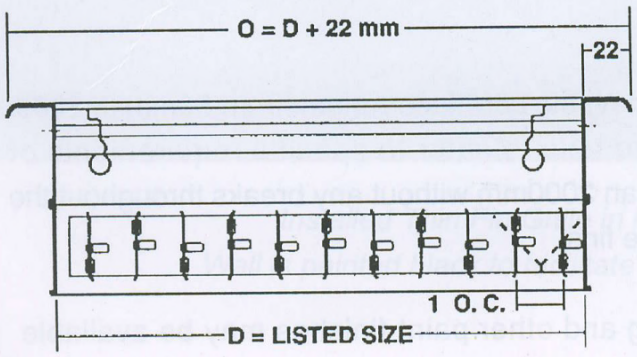


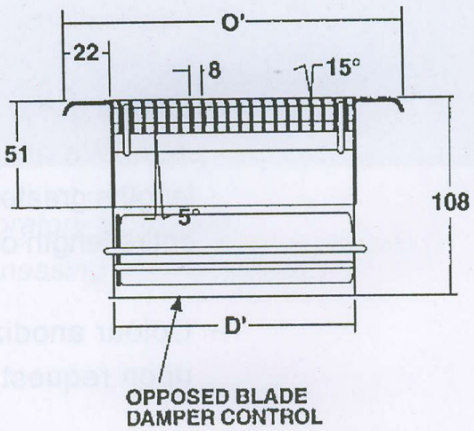


1. Model LBMR/01 (THIN FIN) GRILLE

This (Thin Fin) Grille consists of a core face and a border frame. Spring clips are used to facilitate the easy removal or attachment of the core face from or to the border frame.

Recommendation: for return or exhaust air applications.



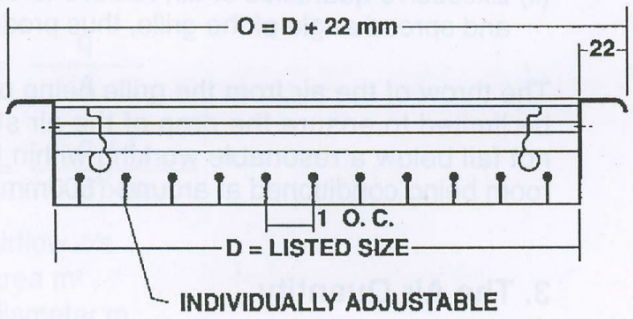


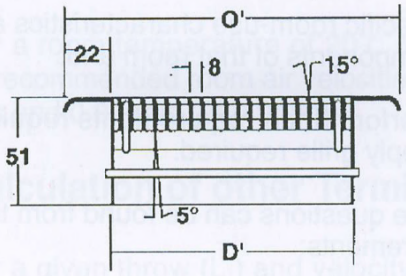
2. Model LBMR/02 (THIN FIN) REGISTER

This (Thin Fin) Register consists of a core face, a border frame and an opposed blade damper. The core face is attached to the front of the border frame by spring clips. The opposed blade damper is attached to the back of the border frame.

Recommendation: for return air or exhaust air applications

Grille Combination

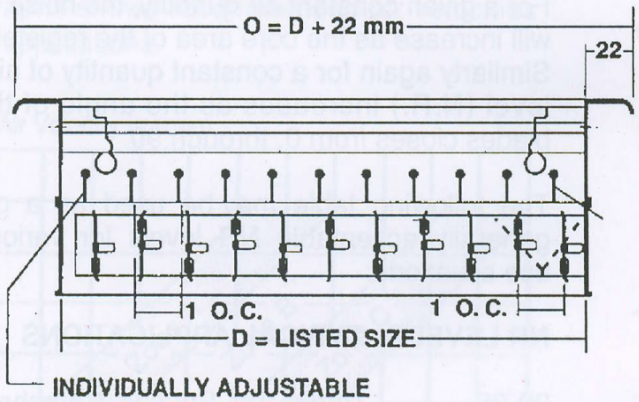


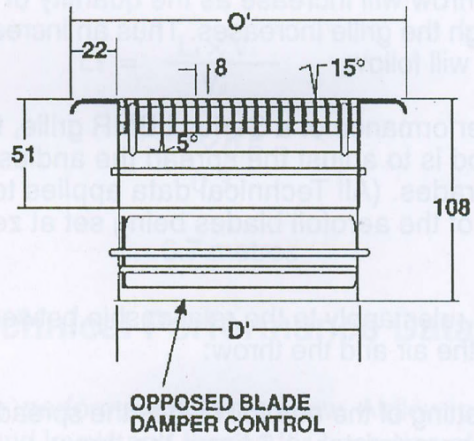


3. Model LBMR/DV1 GRILLE

LBMR/DV1 Grille consists of a core face, a border frame and a rear set of adjustable deflecting vanes. The core face is attached to the front of the border frame by spring clips. The adjustable deflecting vanes can be individually adjusted to cater to different angles of horizontal deflection.

Recommendation: for supply air applications





4. Model LBMR/DV2 (THIN FIN) LAMINAR FLOW LINEAR BAR GRILLE & REGISTER

This (Thin Fin) Laminar Flow Linear Bar Grille & Register consists of a core face, a border frame, a rear set of adjustable deflecting vanes, and an opposed blade damper. The core face is attached to the front of the border frame by spring clips. The set of the adjustable deflecting vanes is attached to the back of the border frame. The opposed blade damper is attached to the back of the border frame behind the set of adjustable deflecting vanes.

Recommendation: for supply air applications

Selecting a LBMR Series Grilles

When selecting a LBMR Series Grille to be used in a specific location and for a specific purpose, two questions have to be asked:

(i) What are the specific room-use characteristics and the structure components of that room and.

(ii) What are the performance requirements required of the actual supply grille required.

The answer to these questions can be found from the following four requirements:

1.The Air Pattern Requirements - Drop.
2.The Throw Requirements.
3.The Air Quantity.
4.The Desired Noise Levels.

1. The Air Pattern Requirement-Drop

For any given constant air quantity (ℓ/s), the air will drop increases as the area of the neck of the specific grille increases. This relationship occurs because of the face of the grille and the neck area of the grille.

Assuming that the spread angle of the aerofoil blades is maintained at a constant setting, the resulting length of the throw will increase as the quantity of air passing through the grille increases. Thus an increase in the air drop will follow.

To alter the performance of a Series LBMR grille, the easiest method is to adjust the spread the andles of the aerofoil brades. (All Technical data applies to a spread angle of the aerofoil blades being set at zero degrees).

Three general rules apply to the relationship between the spread of the air and the throw:

(i) If a 45° setting of the aerofoil blades the spread of the air is approximately 1.5 times the throw.

(ii) at a 22½° setting of the aerofoil blades the speed of the air approximately 0.5 times the throw.

(iii) at a 0° setting of the aerofoil blades the spread of the air approximately 0.35 times the throw.

2. The Throw Requirement

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

(i) Inadequate conditioning which fails to cover the total area.

(ii) Excessive quantities of air, relative to the neck area and spread angle of the grille, thus producing drafts.

The throw of the air from the grille being used should be limited to ensure the drop of the air stream does not fall below a resonable working within the specific room being conditioned at around 1500mm.

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 grille.

4. The Noise Level Specification

The noise level produced by a grille relates directly to the quantity of air being transmitted through the outlet, as well as the neck size and louvre blade spread angle of the register.

For a given constant air quantity, the noise level (N.R.) will increase as the core area of the register decreases. Similarly again for a constant quantity of air, the noise level (N.R.) increases as the angle of the aerofoil blades closes from 0. through 90.

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, T.V. 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.

Air Velocity in a Duct System

Air velocity can be calculated using the following expressions:

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

or

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

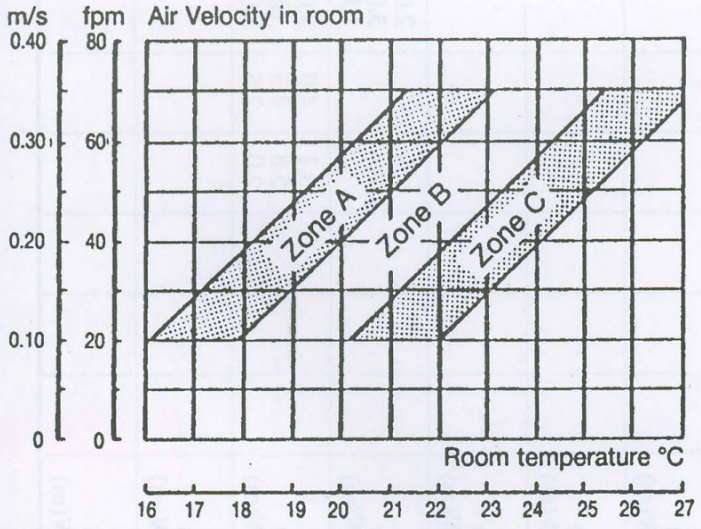
where q = airflow ℓ/s
A = area m²
d = diameter m
v = air velocity m/s

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

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

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 0.10 m/s and 0.20 m/s (20-40 fpm).

Calculation of other Terminal Velocities

For a given throw (L_1) and velocity (V_1), other throws can be calculated for other terminal velocities (V_2,L_2) 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 0.5 m/s, what is the throw with a terminal velocity of 0.3m/s?

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

$$= \frac{4 \times 0.5}{0.3}$$

$$= 6.7 \text{ metres}$$

Technical Performance Data

The performance data 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.

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.

Refer to next page•••

Technical Performance Data

Series: LBMR

T03/02856C

Throws are indicated to a terminal velocity of 0.5m/s (100fpm)

Size (mm)	Air flow L/s	40	50	60	70	80	90	100	150	200	250	300	350	400	450	500	600	700	800	900	1000
800X100	S.P(pa) NR(dB) THROW(m)				3.0 6.0 1.9	3.8 8.0 2.2	5.0 10 3.0	7.3 14 3.5	15 24 5.0	28 34 7.0	43 40 8.0	70 43 9.0	100 45 10.5	110 52 11.6							
600X200	S.P(pa) NR(dB) THROW(m)						1.9 4.0 1.8	2.5 8.0 2.0	5.0 15 3.9	12 24 5.5	16 29 6.5	20 35 7.8	33 39 9.0	45 43 10.0	60 50 11.0	80 54 12.4					
600X300	S.P(pa) NR(dB) THROW(m)								2.2 10 2.1	4.3 18 4.2	7.0 23 5.0	10 27 6.2	14 32 7.4	18 36 8.2	23 40 9.8	36 43 11.2	47 46 12.8	54 52 14.2			
500X400	S.P(pa) NR(dB) THROW(m)								1.9 9 2.0	3.5 17 3.8	5.0 21 4.6	8.0 25 6.0	13 29 7.2	15 34 8.0	18 37 9.4	26 42 10.8	32 45 12	50 49 14.0	62 56 15.0		
1200X300	S.P(pa) NR(dB) THROW(m)										1.6 13 2.1	2.0 16 3.0	3.1 21 4.0	4.0 25 5.6	6.0 29 6.8	9.0 33 8.0	12 36 9.0	14 41 10.6	19 45 12.2	30 50 14.0	40 54 16.0
2000X100	S.P(pa) NR(dB) THROW(m)								2.0 10 2.3	3.5 17 3.8	5.0 23 4.8	8.0 25 6.0	13 30 7.5	15 34 8.0	18 37 9.6	26 41 11.0	32 45 12.0	50 50 14.5	62 56 15.0		
400X350	S.P(pa) NR(dB) THROW(m)						2.0 5.0 1.8	2.5 8.0 2.0	6.0 15 4.0	12 24 5.5	16 29 6.5	20 35 8.0	33 40 9.0	45 43 10.0	60 50 11.0	80 54 13.0					
200X400	S.P(pa) NR(dB) THROW(m)				3.1 5.8 2.0	4.0 8.3 2.5	5.0 10 3.0	7.5 14 3.7	15 25 5.2	30 35 7.2	43 40 8.0	73 45 9.5	100 45 10.5	110 54 12.0							
610X610	S.P(pa) NR(dB) THROW(m)										1.6 13 2.5	2.0 16 3.0	3.1 21 4.0	4.0 25 5.6	6.0 30 6.8	9.0 33 8.0	12 36 9.0	14 41 10.6	19 45 12.2	30 50 14.0	40 54 16.0
600X300	S.P(pa) NR(dB) THROW(m)								2.2 10 2.1	4.3 18 4.2	7.0 23 5.0	10 27 6.2	14 32 7.4	18 36 8.2	23 40 9.8	36 43 11.2	47 46 12.8	54 52 14.2			

CHAN CHUAN CHANG METAL WORKS

BLOCK 5055, #01-1141, ANG MO KIO INDUSTRIAL PARK 2, SINGAPORE 569558.

TEL: 64817736 (3 LINES) FAX: 64813517

Email: sales@ccc.com.sg

Website: http://www.ccc.com.sg