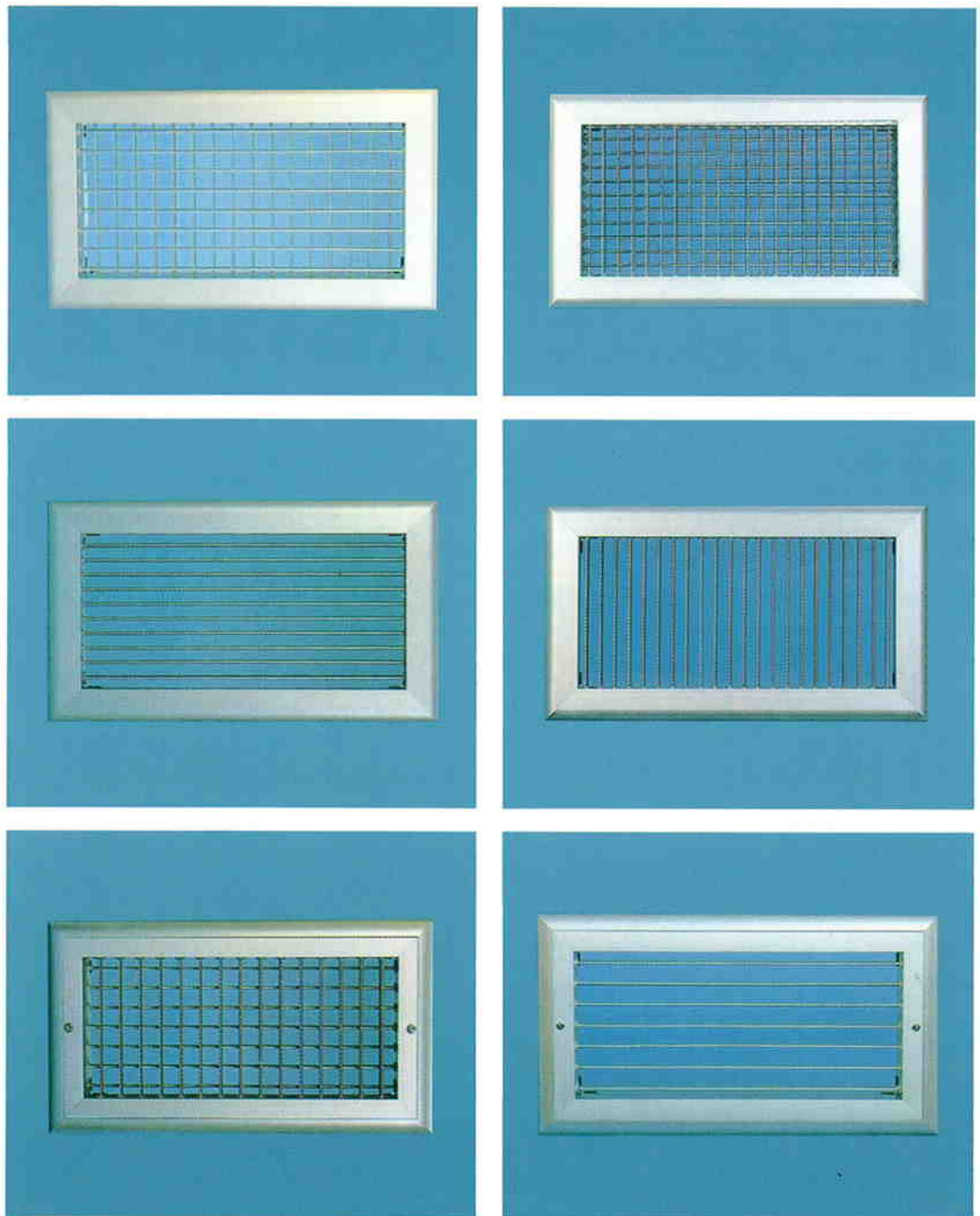


CONNOLS-AIR

SUPPLY AIR GRILLES



LEADER IN AIR DISTRIBUTION PRODUCTS

ADJUSTABLE SINGLE AND DOUBLE DEFLECTION SUPPLY GRILLES AND REGISTERS

MODEL : S119H } Single Deflection With
S119V } 19 mm Blade Spacing

MODEL : S219H } Double Deflection With
S219V } 19 mm Blade Spacing

CONSTRUCTION

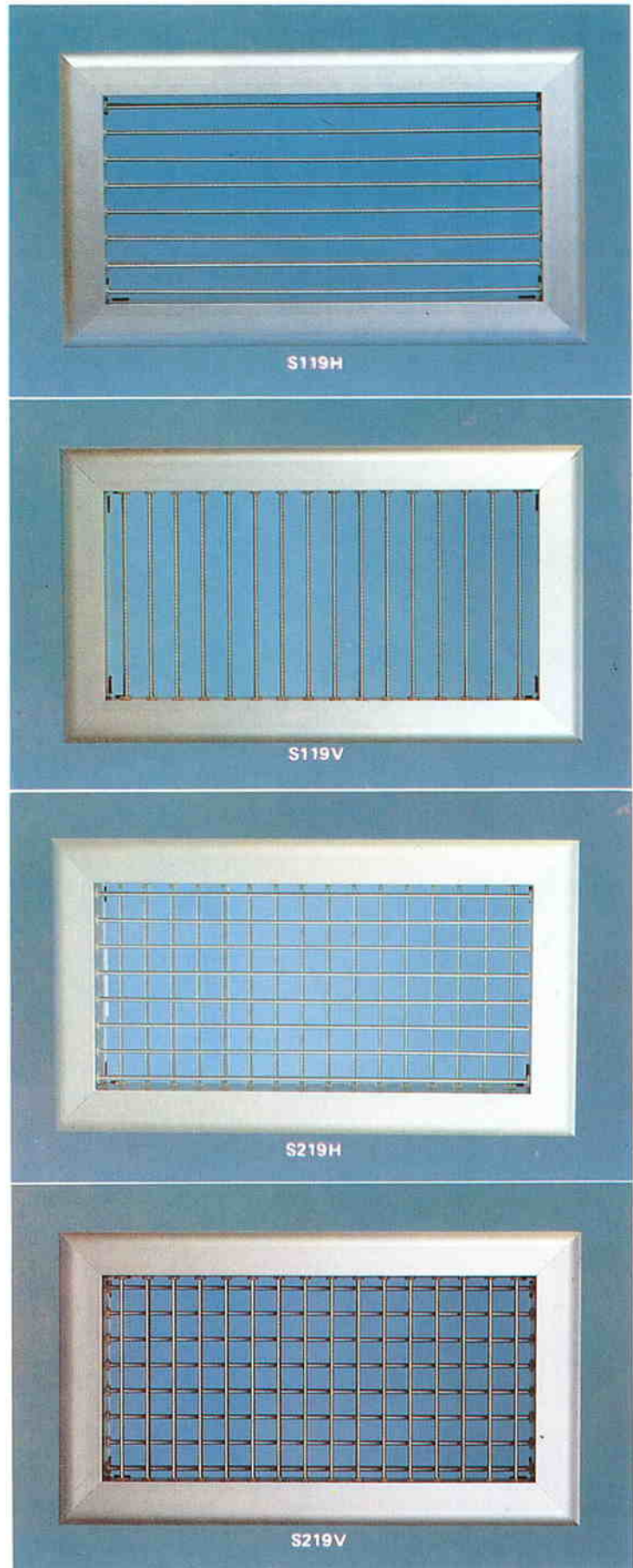
The frames and blades are constructed of corrosion resistance aluminium alloy 6063 tempered to T5. Adjustable blades are fixed to the frame with plastic bush at 19 mm spacing. The frames are assembled using corner inserts.

FEATURES

- Frames and blades are constructed of corrosion resistance aluminium.
- Corner inserts ensure hairline butting of frames.
- Aerofoil Blades fixed at 19mm spacing are designed for greater performance efficiency.
- Each blade is individually adjustable from the face of the grille.
- Horizontal blades of S119H and S219H models allow control of air pattern drop or elevation.
- Vertical blades of S119V and S219V models allow control of air pattern spread.
- Plastic bushings prevent metal to metal contact of the blades and the frames and assure absolutely rattleproof design.
- Frames gasketed to prevent air leakage and minimize smudging.
- Opposed blade damper can be easily adjustable from the face of the grille.
- Matching returns with 0 degree or 45 degree fixed deflecting blades are available.
- Certified performance data obtained from a **NATA INDEPENDENT TESTING LABORATORY**.

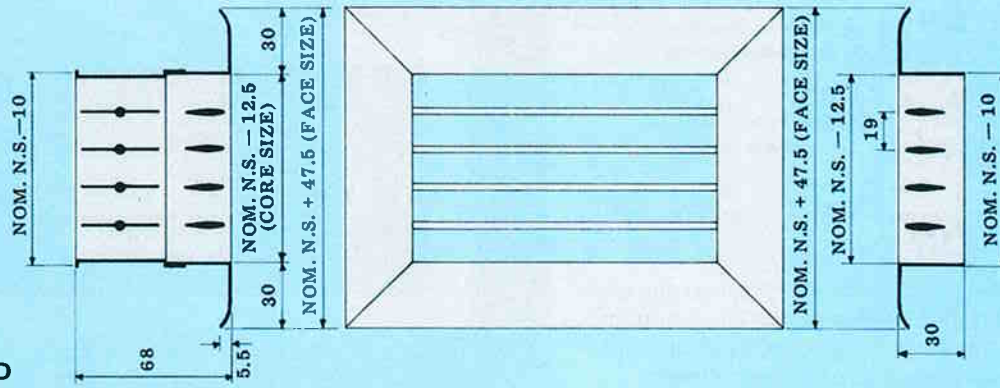
FINISH

Standard finish is baked white enamel. Other colors are available on request. Anodised finishes are also available on request.



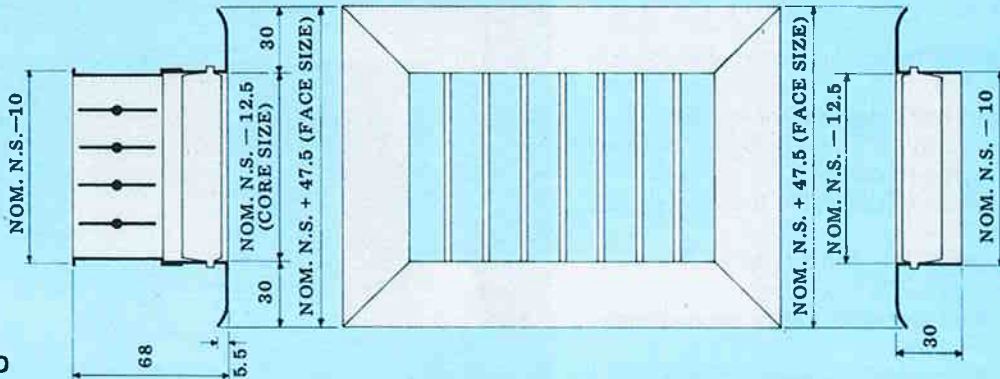
DIMENSIONAL DATA

□ S119H-D



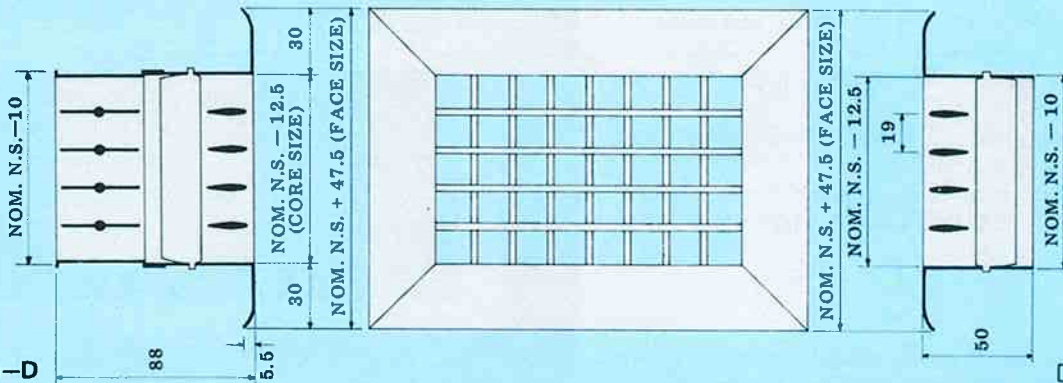
□ S119H

□ S119V-D



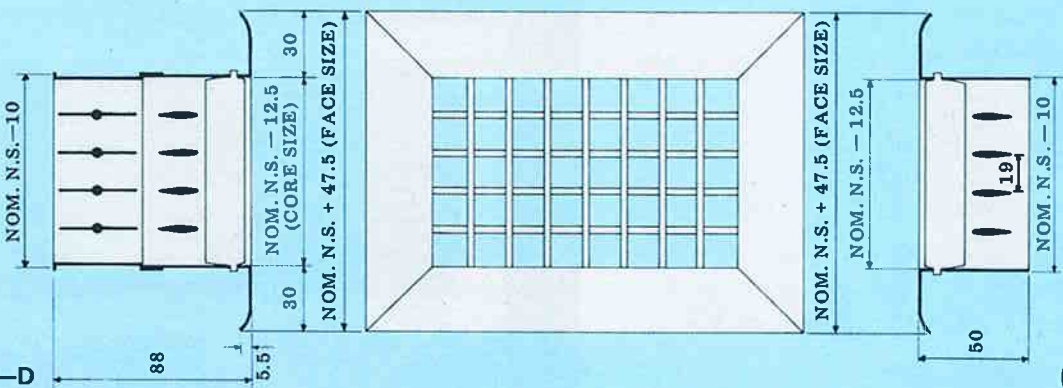
□ S119V

□ S219H-D



□ S219H

□ S219V-D



□ S219V

ADJUSTABLE SINGLE AND DOUBLE DEFLECTION SUPPLY GRILLES AND REGISTERS

MODEL : S113H } Single Deflection With
S113V } 13 mm Blade Spacing

MODEL : S213H } Double Deflection With
S213V } 13 mm Blade Spacing

CONSTRUCTION

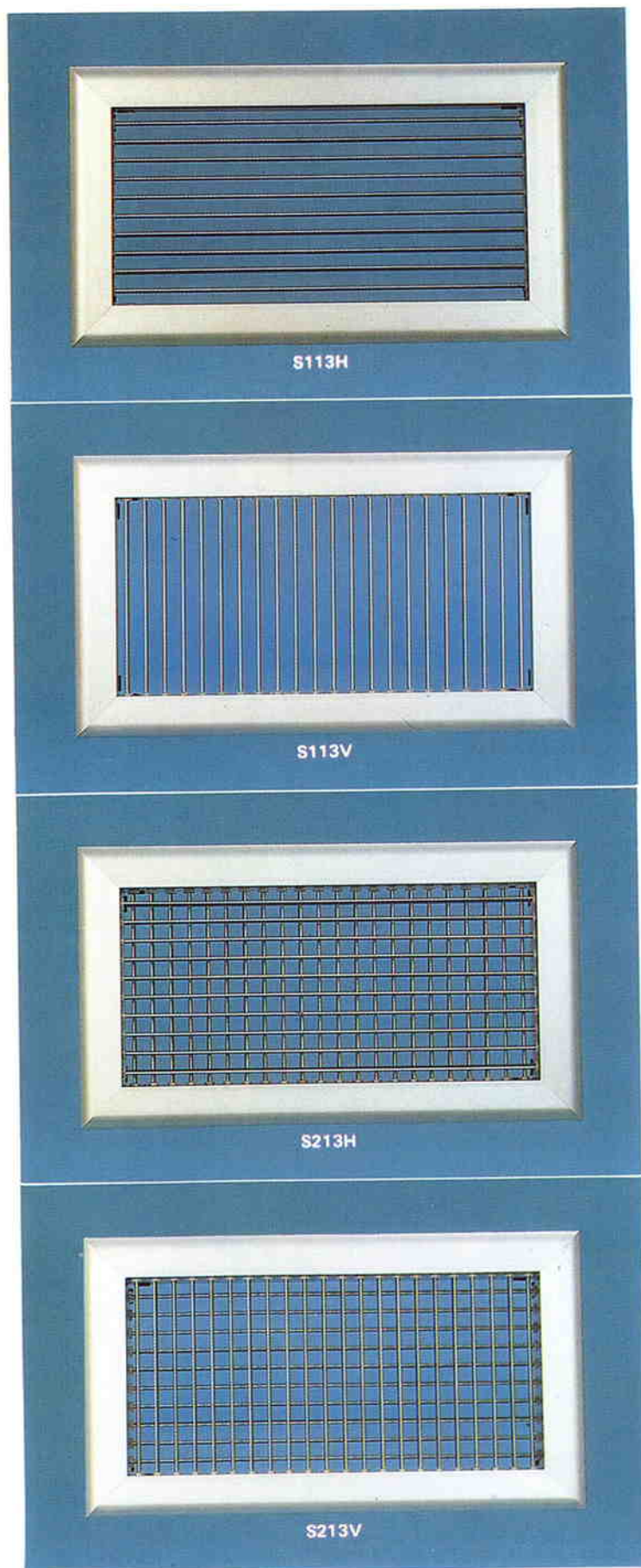
The frames and blades are constructed of corrosion resistance aluminium alloy 6063 tempered to T5. Adjustable blades are fixed to the frame with plastic bush at 13mm spacing. The frames are assembled using corner inserts.

FEATURES

- Frames and blades are constructed of corrosion resistance aluminium.
- Corner inserts ensure hairline butting of frames.
- Aerofoil Blades fixed at 13 mm spacing are designed for greater performance efficiency.
- Each blade is individually adjustable from the face of the grille.
- Horizontal blades of S113H and S213H models allow control of air pattern drop or elevation.
- Vertical blades of S113V and S213V models allow control of air pattern spread.
- Plastic bushings prevent metal to metal contact of the blades and the frames and assure absolutely rattleproof design.
- Frames gasketed to prevent air leakage and minimize smudging.
- Opposed blade damper can be easily adjustable from the face of the grille.
- Matching returns with 0 degree or 45 degree fixed deflecting blades are available.
- Certified performance data obtained from a **NATA INDEPENDENT TESTING LABORATORY.**

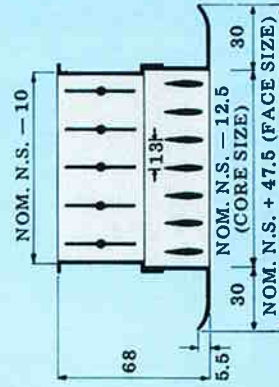
FINISH

Standard finish is baked white enamel. Other colors are available on request. Anodised finishes are also available on request.

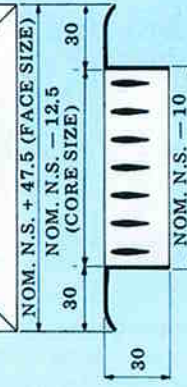


DIMENSIONAL DATA

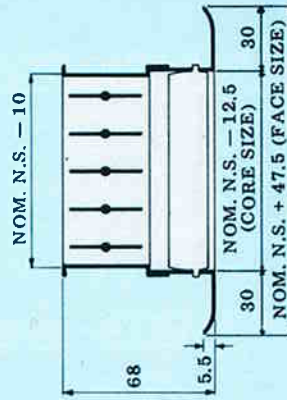
□ S113H-D



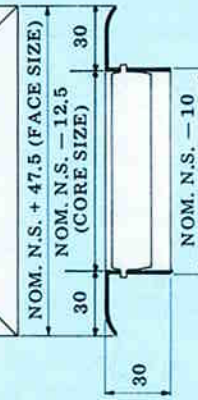
□ S113H



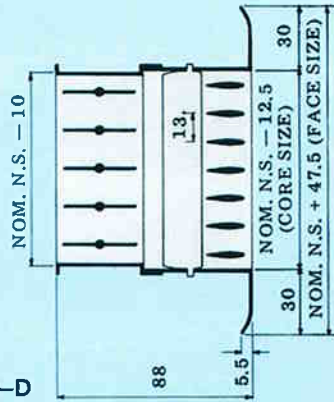
□ S113V-D



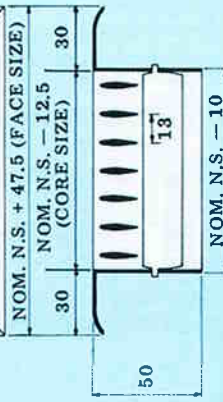
□ S113V



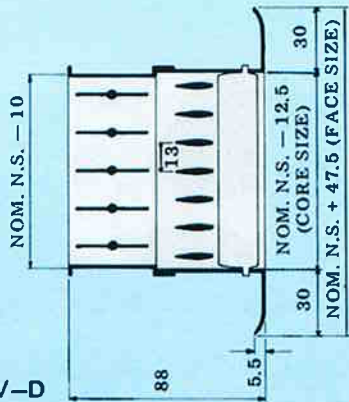
□ S213H-D



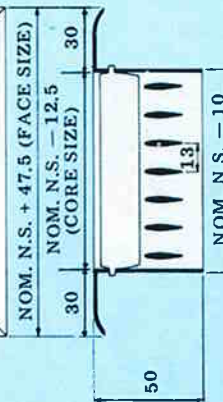
□ S213H



□ S213V-D



□ S213V



REMOVABLE CORE ADJUSTABLE SINGLE AND DOUBLE DEFLECTION SUPPLY GRILLES AND REGISTERS

MODEL : RS119H } Single Deflection With
RS119V } 19 mm Blade Spacing

MODEL : RS219H } Double Deflection With
RS219V } 19 mm Blade Spacing

CONSTRUCTION

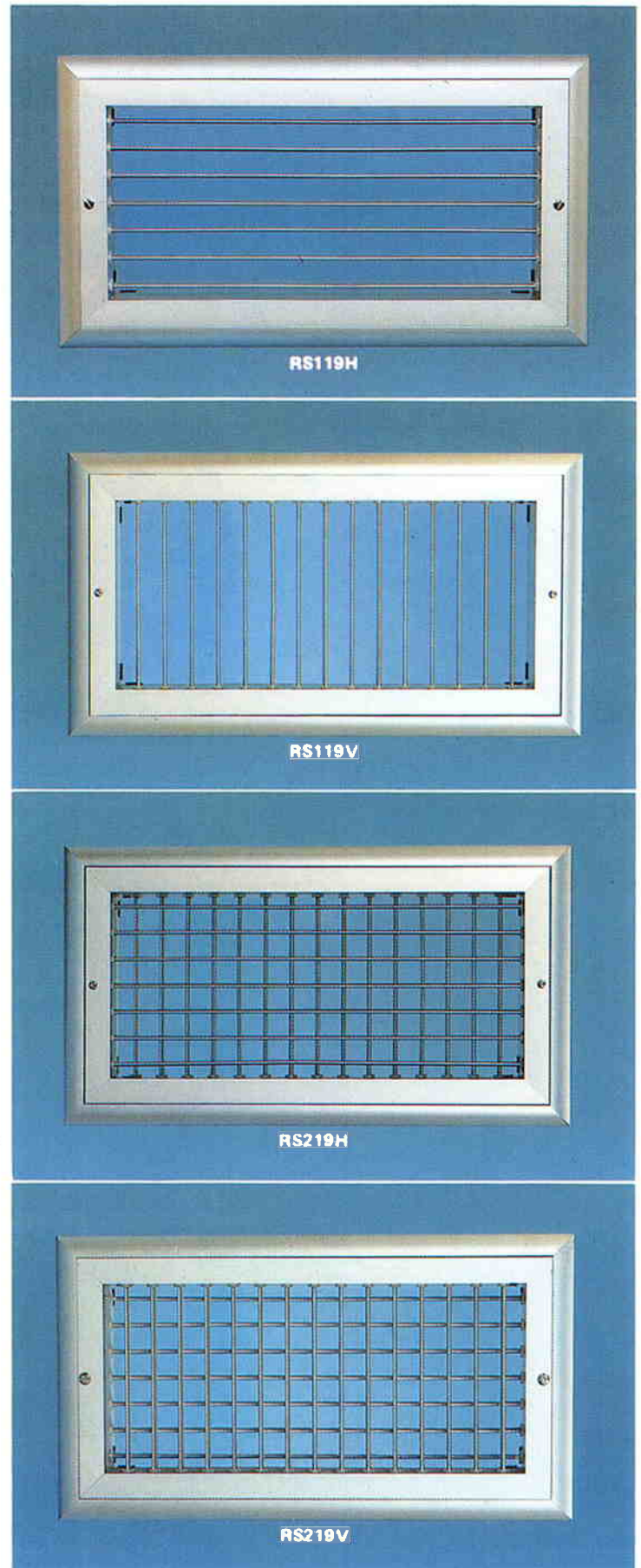
Both removable core (RC) frame and inner core frame are constructed of heavy gage extruded aluminium alloy 6063 tempered to T5. Aerofoil blades also constructed of extruded aluminium are fixed to the inner core frame with plastic bushing at 19mm spacing. Both frames are assembled using corner inserts. The inner core is fastened to the RC frame with sheet metal screw.

FEATURES

- Frames and blades are constructed of corrosion resistance aluminium.
- Corner inserts ensure hairline butting of frames.
- Aerofoil Blades fixed at 19mm spacing are designed for greater performance efficiency.
- Each blade is individually adjustable from the face of the grille.
- Horizontal blades of RS119H and RS219H models allow control of air pattern drop or elevation.
- Vertical blades of RS119V and RS219V models allow control of air pattern spread.
- Plastic bushings prevent metal to metal contact of the blades and the frames and assure absolutely rattleproof design.
- Frames gasketed to prevent air leakage and minimize smudging.
- Opposed blade damper can be easily adjustable from the face of the grille.
- Matching returns with 0 degree or 45 degree fixed deflecting blades are available.
- Certified performance data obtained from a **NATA INDEPENDENT TESTING LABORATORY.**

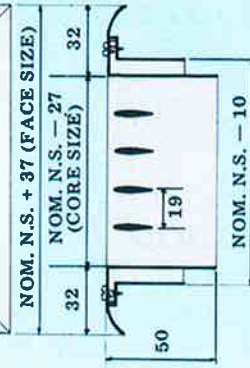
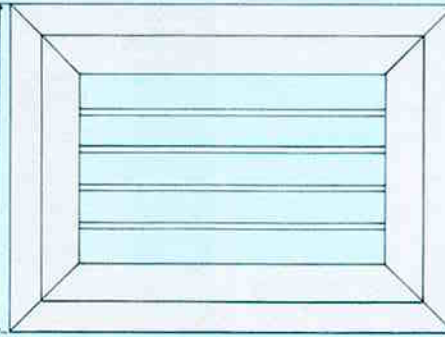
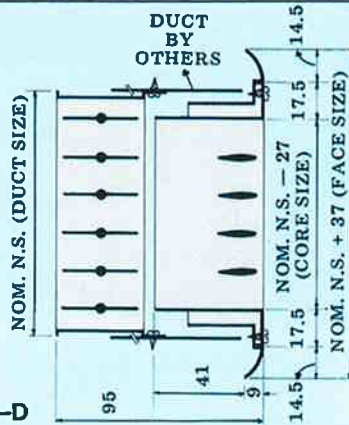
FINISH

Standard finish is baked white enamel. Other colors are available on request. Anodised finishes are also available on request.



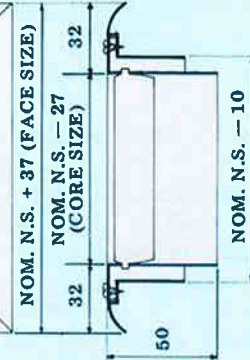
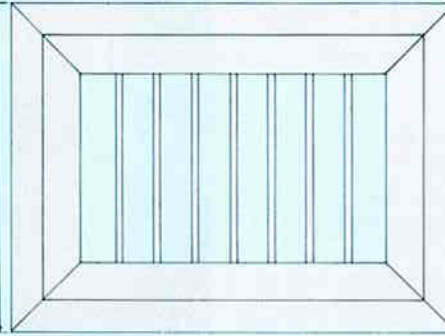
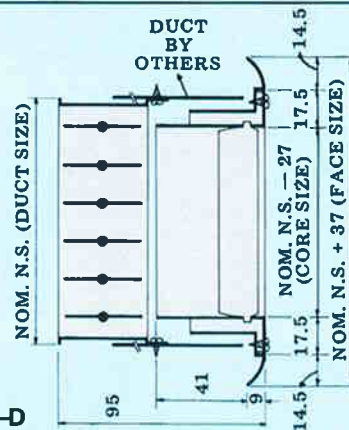
DIMENSIONAL DATA

□ RS119H-D



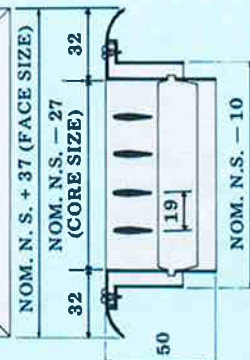
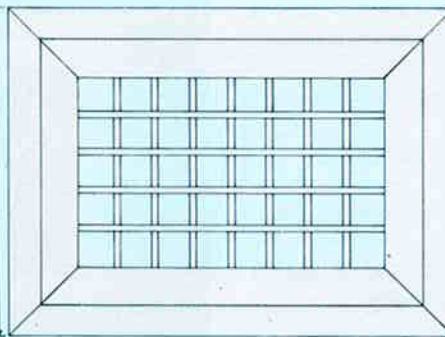
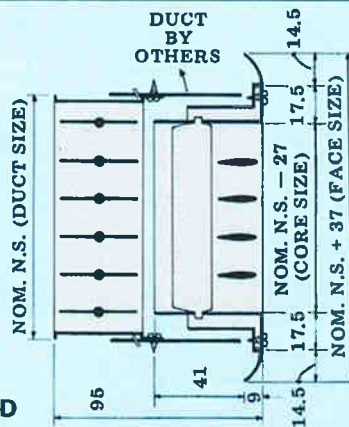
□ RS119H

□ RS119V-D



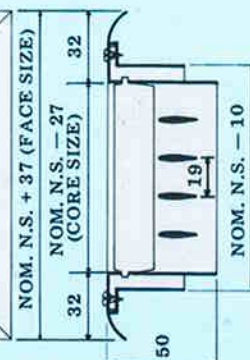
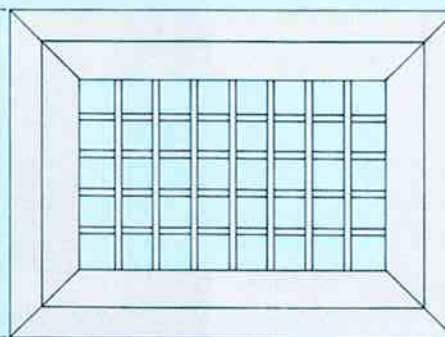
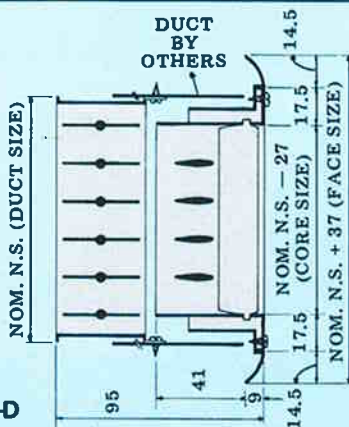
□ RS119V

□ RS219H-D



□ RS219H

□ RS219V-D



□ RS219V

REMOVABLE CORE ADJUSTABLE SINGLE AND DOUBLE DEFLECTION SUPPLY GRILLES AND REGISTERS

MODEL : RS113H } Single Deflection With
RS113V } 13 mm Blade Spacing

MODEL : RS213H } Double Deflection With
RS213V } 13 mm Blade Spacing

CONSTRUCTION

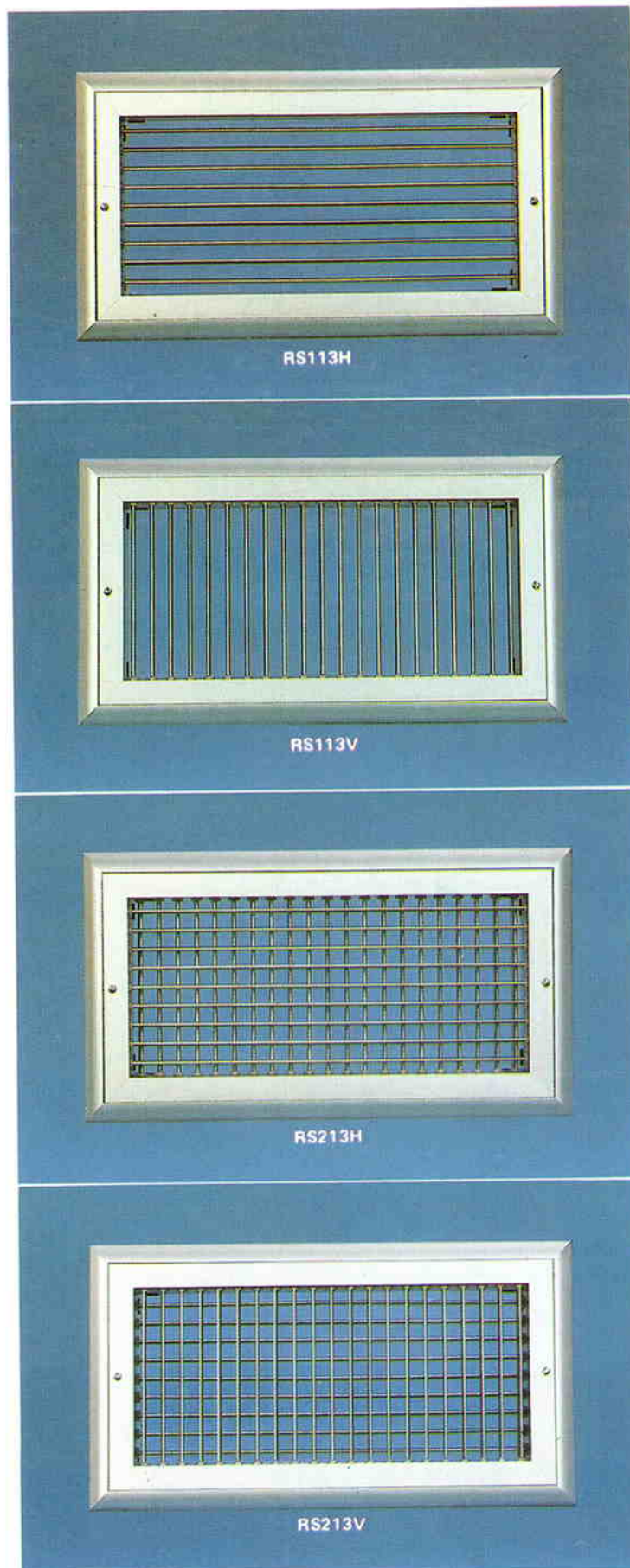
Both removable core (RC) frame and inner core frame are constructed of heavy gage extruded aluminium alloy 6063 tempered to T5. Aerofoil blades also constructed of extruded aluminium are fixed to the inner core frame with plastic bushing at 13 mm spacing. Both frames are assembled using corner inserts. The inner core is fastened to the RC frame with sheet metal screw.

FEATURES

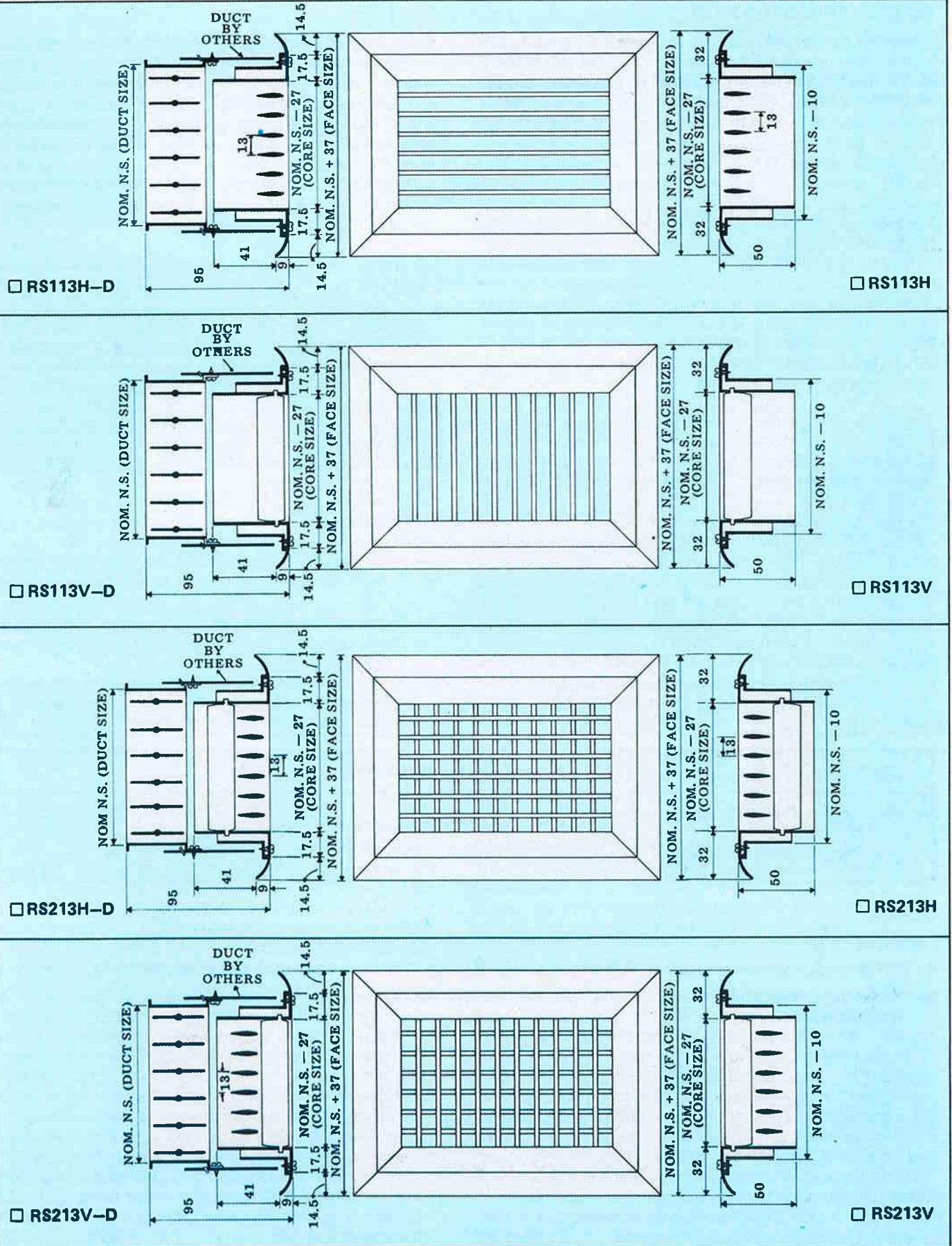
- Frames and blades are constructed of corrosion resistance aluminium.
- Corner inserts ensure hairline butting of frames.
- Aerofoil Blades fixed at 13 mm spacing are designed for greater performance efficiency.
- Each blade is individually adjustable from the face of the grille.
- Horizontal blades of RS113H and RS213H models allow control of air pattern drop or elevation.
- Vertical blades of RS113V and RS213V models allow control of air pattern spread.
- Plastic bushings prevent metal to metal contact of the blades and the frames and assure absolutely rattleproof design.
- Frames gasketed to prevent air leakage and minimize smudging.
- Opposed blade damper can be easily adjustable from the face of the grille.
- Matching returns with 0 degree or 45 degree fixed deflecting blades are available.
- Certified performance data obtained from a **NATA INDEPENDENT TESTING LABORATORY.**

FINISH

Standard finish is baked white enamel. Other colors are available on request. Anodised finishes are also available on request.



DIMENSIONAL DATA



PERFORMANCE DATA AND SELECTION OF AIR OUTLETS

SOUND CONSIDERATION

The sound data in the following tables are derived from tests of the grilles in a reverberation room of an **INDEPENDENT NATA (NATIONAL ASSOCIATION OF TESTING AUTHORITIES) TESTING LABORATORY**. Sound data obtained are expressed in NR rating based on a room attenuation of 6db (re 10^{-12} watts) for an average room. For room not considered average NR values should be adjusted when making selection.

In general sound consideration is the most important criteria for the selection of an outlet. Join sound generated by air outlets is radiated directly into the room. Such devices must be selected for a sufficiently low noise output. An outlet can be selected to meet any design goal merely by keeping the air velocity sufficiently low. It is possible that an air distribution system can contain other sources of noise such as supply fan. Adequate care must be taken to attenuate upstream noise to acceptable levels.

The sound level of air outlets depends not only on the air quantity and size but also on the air approach conditions. Manufacturers ratings apply only to outlets installed as recommended. Poor approach conditions can easily increase sound levels by 10 to 20db above the manufacturers ratings. In order to meet the very stringent requirements of acoustically critical spaces, such as concert halls, the air distribution system must be laid out very carefully. It is usually necessary to avoid balancing dampers at the outlet and to provide long approach to achieve uniform air flow at the outlet. Where space constraint does not permit a long approach to an outlet extractor should be installed at the duct take-off. This extractor extracts, equalizes and provides volume control of air to the outlet. Air extractor should be used where the duct collar is shorter than two times the dimension of the duct.

When a balancing damper is installed close to an air outlet, the air flow velocity in some parts of the outlet will increase when the damper is throttled. Drastic dampering at the grille will result in considerable db increase if the pressure at grille is high. Dampering at the grille should be reserved for fine balancing and the majority of the balancing should be provided by dampers upstream in the supply duct. The remote location of the damper allows for acoustical lining before the grille (see figure 8). The effect of dampering is indicated in the table 1.

TABLE 1 EFFECT OF DAMPER		
EFFECTIVE DAMPER OPENING	TOTAL RESISTANCE	DB TO BE ADDED
100%	100%	0db
80%	150%	5db
70%	200%	8db
50%	400%	16db

In selecting a grille allowance must also be made for the multiplying effect of multiple grilles as tabulated data are for one grille only. When two or more grilles are used in the same room the resulting sound level is the logarithmic addition of all the sound levels. This is to be done as follows:-

1. Compare the highest two NR levels of the grilles and check table 2 for the db to be added to the higher level.
2. Compare the NR level of the third grille to the resultant NR level from step 1 and check table 2 below again for the db to be added to the higher level.

TABLE 2 ADDITION OF SOUND OF GRILLES											
Sound Power Level Difference Between Grilles	0	1	2	3	4	5	6	7	8	9	10
Sound Power Level To Be Added	3	2.5	2	1.5	1.5	1	1	.5	0	0	0

Example:-

Determine the NR level of a space served by 2 supply air grilles with NR 35 and a return air grille with NR 40.

1. NR difference between a supply grille and the return grille is 5db. Therefore adding 1db to NR 40 give NR 41.
2. NR difference between a supply grille and the resultant NR 41 from above is 6db. Therefore adding 1db to NR 41 give a space NR 42.

RECOMMENDED NOISE CRITERIA FOR ROOMS

Type of Area	NC Level, Decibels	Type of Area	NC Level, Decibels
AUDITORIUMS		Bowling Alleys, Gymnasiums	35 to 45
Concert and Opera Halls, Studios for sound reproduction	20 to 25	Swimming Pools	40 to 55
Legitimate Theaters, Multi-Purpose Halls	25 to 30	TRANSPORTATION	
Movie Theaters, Lecture Halls, Planetarium, TV Audience Studios	30 to 35	Ticket Sales Offices	30 to 40
Lobbies	35 to 45	Lounges, Waiting Rooms	35 to 50
CHURCHES AND SCHOOLS		HOTELS	
Sanctuaries	20 to 30	Individual Rooms or Suites, Ball Rooms, Banquet Rooms	30 to 40
Libraries, Schools and Classrooms	30 to 40	Halls and Corridors, Lobbies	35 to 40
Laboratoires	35 to 45	Garages, Kitchens and Laundries	40 to 50
Recreation Halls, Corridors and Halls	35 to 50	MANUFACTURING AREAS	
Kitchens	40 to 50	Foreman's Office	40 to 50
HOSPITALS AND CLINICS		Assembly Lines, Light Machinery	45 to 70
Private Rooms	25 to 35	Foundries, Heavy Machinery	55 to 75
Operating Rooms, Wards	30 to 40	OFFICES	
Halls and Corridors, Laboratories, Lobbies and Waiting Rooms	35 to 45	Board Room	20 to 30
Washrooms and Toilets	40 to 50	Conference Rooms	25 to 35
RESTAURANTS & LOUNGES		Executive Office	30 to 40
Restaurants	35 to 45	Supervisor Office, Reception Room	30 to 45
Cocktail Lounges	35 to 50	General Open Offices, Drafting Rooms	35 to 50
Night Clubs	35 to 45	Halls and Corridors	35 to 55
Cafeteria	40 to 50	Tabulation and Computation	40 to 50
STORES RETAIL		PUBLIC BUILDINGS	
Clothing Stores, Department Stores (upper floors)	35 to 45	Public Libraries, Museums, Court Rooms	30 to 40
Department Stores (main floor), Small Retail Stores, Supermarkets	40 to 50	Post Offices, General Banking Areas, Lobbies	35 to 45
SPORTS ACTIVITIES INDOOR		Washrooms and Toilets	40 to 50
Coliseums	30 to 40		

THROW AND DROPS

The throw values are based on a terminal velocity of 0.25m/s and isothermal air. Grilles of equal capacities should be sized for throw equal to half the distance between them. Throw from single outlets should be size at 75% to 100% of the distance to the opposite wall. Please note that these data are based on wall mounting heights of 2.5–3.0 meters. The room velocity will be affected by changes in the mounting height. The throw listed should, therefore increased 300mm for each 300mm of mounting height above 3.0 meters in order to maintain a maximum room velocity of 0.25m/s.

In general, drop is proportional to throw. For isothermal air and 0 degree blade deflection vertical expansion alone will caused a drop of approximate, 0.3m for every 2.4m of throw. A cooling temperature differential will increase the drop. Therefore, for low ceiling it may be necessary to use several small grilles with lesser throws instead of one large grille with a long throw and large drop. As a guide, 18 degree cooling temperature differential is the working limit for grilles unless some alleviating factors are present, such as room to deflect upwards to create higher trajectory. Single deflection grilles and registers perform effectively with cooling temperature differentials of up to 18-20 degree C and double deflection

supply grilles and registers with a cooling temperature differential of up to 20-22 degree C.

Tests show that single deflection supply grilles have approximately 5% more free area than the double deflection grilles. These difference in the free area is considered insignificant and will not affect the throw and drop characteristics of the outlet. As the result, the performance data tabulated is applicable to either single or double deflection grille.

BLADE SETTING

Effective area is affected by blade deflection setting of the grille. Hence, throw, drop, pressure loss and noise generated by the grille will depend on the blade deflection setting. Maximum throw values occur with vertical blades set to 0 degree deflection. The normal stream expansion in this case is roughly 8–14 degree. As the deflection settings are increased, throw values will shorten. This is due partly to the increased exposure of primary air to room air and the resulting entrainment of larger quantities of room air. This dissipates the primary air more quickly. Adjustment of the horizontal blades will have the same effect on throw values. Parallel adjustment of horizontal blades toward the ceiling can cause a slight increase in throw subject to ceiling effect.



PERFORMANCE DATA

FLOW (LPS)	NOMINAL NECK SIZE (mm)	CORE AREA (Sq. m)	*0 DEGREE SPREAD*			*22 DEGREE SPREAD*		
			PD (Pa)	THROW (m)	NR	PD (Pa)	THROW (m)	NR
25	100 X 100	.00766	8	2.61	11	9	1.22	18
50	100 X 100	.00766	25	3.91	25	37	2.05	32
	150 X 100	.01203	11	3.59	18	14	1.79	25
	150 X 150	.01891	5	3.30	11	6	1.58	17
60	150 X 100	.01203	15	3.99	22	21	2.05	28
	150 X 150	.01891	6	3.67	15	8	1.80	21
80	150 X 150	.01891	10	4.33	21	14	2.23	27
	200 X 150	.02578	6	4.09	16	7	2.04	22
100	150 X 150	.01891	15	4.93	25	22	2.63	31
	200 X 150	.02578	9	4.65	20	12	2.41	26
	300 X 150	.03953	4	4.29	13	5	2.13	20
	200 X 200	.03516	5	4.39	15	6	2.20	21
	250 X 250	.05641	2	4.02	8	2	1.92	14
125	150 X 150	.01891	22	5.61	30	35	3.10	36
	200 X 150	.02578	12	5.30	25	18	2.84	31
	300 X 150	.03953	6	4.89	18	7	2.51	24
	200 X 200	.03516	7	5.00	20	9	2.59	26
	300 X 200	.05391	3	4.61	13	4	2.29	19
150	200 X 150	.02578	17	5.89	29	26	3.25	34
	300 X 150	.03953	8	5.43	22	11	2.87	28
	400 X 150	.05328	5	5.14	17	6	2.63	23
	600 X 150	.08078	2	4.75	10	2	2.33	16
	200 X 200	.03516	10	5.55	24	14	2.97	29
	300 X 200	.05391	4	5.13	17	6	2.62	23
	400 X 200	.07266	3	4.85	12	3	2.41	18
	250 X 250	.05641	4	5.08	16	5	2.59	22
175	200 X 150	.02578	22	6.44	32	35	3.64	37
	300 X 150	.03953	10	5.94	25	14	3.22	31
	400 X 150	.05328	6	5.62	20	8	2.95	26
	200 X 200	.03516	12	6.08	27	18	3.33	33
	300 X 200	.05391	6	5.61	20	8	2.94	26
	400 X 200	.07266	3	5.30	15	4	2.70	21
	250 X 250	.05641	5	5.56	19	7	2.90	25
200	300 X 150	.03953	13	6.44	28	19	3.55	33
	400 X 150	.05328	7	6.09	23	10	3.26	29
	600 X 150	.08078	3	5.63	16	4	2.89	22
	200 X 200	.03516	16	6.58	30	24	3.67	35
	300 X 200	.05391	7	6.07	23	10	3.25	28
	400 X 200	.07266	4	5.74	18	5	2.98	24
	600 X 200	.11016	2	5.31	11	2	2.64	17
	250 X 250	.05641	7	6.02	22	9	3.20	28
	300 X 250	.06828	5	5.81	19	6	3.03	25
250	400 X 150	.05328	11	6.93	28	16	3.84	33
	600 X 150	.08078	5	6.41	21	7	3.41	27
	800 X 150	.10828	3	6.06	16	4	3.13	22
	1000 X 150	.13578	2	5.81	12	2	2.93	18
	300 X 200	.05391	10	6.91	27	15	3.83	33
	600 X 200	.11016	3	6.04	16	3	3.11	22
	800 X 200	.14766	2	5.72	11	2	2.86	17
	250 X 250	.05641	10	6.85	27	14	3.78	32
	300 X 300	.08266	5	6.38	20	6	3.38	26
	400 X 300	.11141	3	6.03	16	3	3.10	21
	600 X 300	.16891	1	5.58	9	1	2.75	15

PERFORMANCE DATA

FLOW (LPS)	NOMINAL NECK SIZE (mm)	CORE AREA (Sq. m)	*0 DEGREE SPREAD*			*22 DEGREE SPREAD*		
			PD (Pa)	THROW (m)	NR	PD (Pa)	THROW (m)	NR
300	400 X 150	.05328	14	7.70	31	23	4.40	37
	600 X 150	.08078	7	7.12	25	9	3.90	30
	800 X 150	.10828	4	6.74	20	5	3.58	26
	1200 X 150	.16328	2	6.24	13	2	3.18	19
	300 X 200	.05391	14	7.69	31	22	4.38	37
	400 X 200	.07266	8	7.27	26	12	4.02	32
	600 X 200	.11016	4	6.72	20	5	3.56	25
	800 X 200	.14766	2	6.36	15	3	3.27	21
	300 X 300	.08266	6	7.09	24	9	3.87	30
	400 X 300	.11141	4	6.70	19	5	3.55	25
	600 X 300	.16891	2	6.20	13	2	3.15	19
400	800 X 150	.10828	6	7.97	26	9	4.43	31
	1200 X 150	.16328	3	7.38	19	4	3.94	25
	1500 X 150	.20453	2	7.07	16	2	3.69	21
	600 X 200	.11016	6	7.94	26	9	4.41	31
	800 X 200	.14766	4	7.52	21	5	4.05	26
	1200 X 200	.22266	2	6.96	14	2	3.60	20
	300 X 300	.08266	10	8.38	30	16	4.79	35
	400 X 300	.11141	6	7.92	25	9	4.40	31
	600 X 300	.16891	3	7.33	19	4	3.90	24
	800 X 300	.22641	2	6.94	14	2	3.58	20
500	800 X 150	.10828	9	9.07	31	14	5.23	36
	1200 X 150	.16328	4	8.40	24	6	4.64	29
	1500 X 150	.20453	3	8.05	20	4	4.35	26
	1800 X 150	.24578	2	7.77	17	3	4.12	23
	600 X 200	.11016	9	9.04	30	14	5.20	35
	800 X 200	.14766	5	8.56	25	7	4.78	31
	1200 X 200	.22266	3	7.92	19	3	4.24	24
	1500 X 200	.27891	2	7.59	15	2	3.98	21
	400 X 300	.11141	9	9.02	30	13	5.18	35
	600 X 300	.16891	4	8.34	23	6	4.60	29
	800 X 300	.22641	2	7.90	19	3	4.22	24
	1200 X 300	.34141	1	7.31	12	1	3.75	18
	400 X 400	.15016	5	8.53	25	7	4.76	31
	600 X 400	.22766	2	7.89	18	3	4.22	24
	800 X 400	.30516	1	7.46	14	2	3.87	19
	500 X 500	.23766	2	7.82	18	3	4.16	23
600	1200 X 150	.16328	6	9.33	28	9	5.31	33
	1500 X 150	.20453	4	8.95	24	5	4.98	29
	1800 X 150	.24578	3	8.64	21	4	4.72	26
	800 X 200	.14766	7	9.51	29	11	5.47	34
	1200 X 200	.22266	3	8.81	23	5	4.86	28
	1500 X 200	.27891	2	8.44	19	3	4.55	24
	1800 X 200	.33516	2	8.15	16	2	4.32	21
	600 X 300	.16891	6	9.27	27	8	5.26	32
	800 X 300	.22641	3	8.78	22	4	4.83	28
	1200 X 300	.34141	2	8.13	16	2	4.29	21
	1500 X 300	.42766	1	7.79	12	1	4.02	18
	400 X 400	.15016	7	9.48	29	10	5.44	34
	600 X 400	.22766	3	8.77	22	4	4.83	28
	800 X 400	.30516	2	8.30	18	2	4.43	23
	1200 X 400	.46016	1	7.68	11	1	3.94	16

PERFORMANCE DATA



FLOW (LPS)	NOMINAL NECK SIZE (mm)	CORE AREA (Sq. m)	*0 DEGREE SPREAD*			*22 DEGREE SPREAD*		
			PD (Pa)	THROW (m)	NR	PD (Pa)	THROW (m)	NR
600	500 X 500	.23766	3	8.70	22	4	4.77	27
	800 X 500	.38391	1	7.95	14	1	4.15	19
700	1500 X 150	.20453	5	9.79	27	7	5.58	32
	1800 X 150	.24578	4	9.46	24	5	5.29	29
	1200 X 150	.22266	4	9.63	26	6	5.44	31
	1500 X 200	.27891	3	9.23	22	4	5.10	27
	1800 X 200	.33516	2	8.92	19	3	4.84	25
	600 X 300	.16891	7	10.15	30	11	5.90	35
	800 X 300	.22641	4	9.60	26	6	5.42	31
	1200 X 300	.34141	2	8.89	19	3	4.81	24
	1500 X 300	.42766	1	8.52	15	2	4.51	21
	1800 X 400	.51391	1	8.23	12	1	4.27	18
	400 X 400	.15016	9	10.37	32	14	6.10	37
	600 X 400	.22766	4	9.59	25	6	5.41	31
	800 X 600	.30516	2	9.08	21	3	4.97	26
	1200 X 600	.46016	1	8.40	14	1	4.41	20
	600 X 600	.34516	2	8.87	19	2	4.80	24
	800 X 800	.46266	1	8.40	14	1	4.41	19
800	1500 X 150	.20453	6	10.57	30	9	6.16	35
	1800 X 150	.24578	5	10.22	27	6	5.84	32
	1200 X 200	.22266	6	10.41	29	8	6.01	34
	1800 X 200	.33516	3	9.64	22	3	5.34	27
	800 X 300	.22641	5	10.37	28	8	5.98	33
	1200 X 300	.34141	3	9.60	22	3	5.31	27
	1800 X 300	.51391	1	8.89	15	1	4.72	20
	600 X 400	.22766	5	10.36	28	8	5.97	33
	800 X 400	.30516	3	9.81	24	4	5.49	29
	1200 X 400	.46016	1	9.08	17	2	4.87	22
	1500 X 400	.57641	1	8.70	13	1	4.56	19
	600 X 600	.34516	2	9.58	22	3	5.29	27
	800 X 600	.46266	1	9.07	17	2	4.86	22
	1200 X 600	.69766	1	8.40	10	1	4.32	16
	1200 X 600	.69766	1	8.40	10	1	4.32	16
900	1200 X 200	.22266	7	11.14	31	10	6.56	36
	1500 X 200	.27891	4	10.68	27	6	6.14	32
	1800 X 200	.33516	3	10.32	24	4	5.83	30
	800 X 300	.22641	6	11.11	31	10	6.52	36
	1200 X 300	.34141	3	10.28	24	4	5.79	29
	1800 X 300	.51391	1	9.52	18	2	5.15	23
	600 X 400	.22766	6	11.10	31	10	6.51	36
	800 X 400	.30516	4	10.50	26	5	5.99	31
	1200 X 400	.46016	2	9.72	19	2	5.32	25
	1500 X 400	.57641	1	9.32	16	1	4.98	21
	600 X 600	.34516	3	10.26	24	4	5.78	29
	900 X 600	.46266	2	9.71	19	2	5.31	24
	1200 X 600	.69766	1	8.99	13	1	4.71	18
1000	1500 X 200	.27891	5	11.36	30	8	6.64	35
	1800 X 200	.33516	4	10.97	27	5	6.30	32
	1000 X 300	.28391	5	11.32	29	7	6.61	34
	1200 X 300	.34141	4	10.93	26	5	6.26	31
	1500 X 300	.42766	2	10.48	23	3	5.87	28
	1800 X 300	.51391	2	10.12	20	2	5.57	25



PERFORMANCE DATA

FLOW (LPS)	NOMINAL NECK SIZE (mm)	CORE AREA (Sq m)	*0 DEGREE SPREAD*			*22 DEGREE SPREAD*		
			PD (Pa)	THROW (m)	NR	PD (Pa)	THROW (m)	NR
1000	800 X 400	.30516	5	11.17	28	6	6.47	33
	1200 X 400	.46016	2	10.34	22	3	5.75	27
	1500 X 400	.57641	1	9.91	18	2	5.38	23
	1800 X 400	.69266	1	9.57	15	1	5.11	20
	500 X 500	.23766	7	11.70	32	11	6.96	37
	800 X 500	.38391	3	10.69	24	4	6.06	29
	1000 X 500	.48141	2	10.25	21	2	5.67	26
	1200 X 500	.57891	1	9.90	18	2	5.38	23
	1500 X 500	.72516	1	9.49	14	1	5.04	19
	600 X 600	.34516	4	10.91	26	5	6.24	31
	800 X 600	.46266	2	10.33	21	3	5.74	27
	1200 X 600	.69766	1	9.56	15	1	5.10	20
1200	1200 X 300	.34141	5	12.15	30	7	7.17	35
	1500 X 300	.42766	3	11.65	27	5	6.72	31
	1800 X 300	.51391	2	11.26	24	3	6.37	29
	900 X 400	.34391	5	12.14	30	7	7.15	35
	1200 X 400	.46016	3	11.49	25	4	6.58	30
	1500 X 400	.57641	2	11.02	22	2	6.16	27
	1800 X 400	.69266	1	10.64	19	2	5.84	24
	800 X 500	.38391	4	11.89	28	6	6.93	33
	1200 X 500	.57891	2	11.01	22	2	6.15	27
	600 X 600	.34516	5	12.13	30	7	7.15	35
	800 X 600	.46266	3	11.48	25	4	6.57	30
	1200 X 600	.69766	1	10.63	19	2	5.83	24
	1500 X 600	.87391	1	10.19	15	1	5.46	20
1400	1200 X 400	.46016	4	12.57	29	5	7.37	33
	1500 X 400	.57641	2	12.05	25	3	6.91	30
	1800 X 400	.69266	2	11.64	22	2	6.55	27
	1000 X 500	.48141	3	12.46	28	5	7.28	33
	1200 X 500	.57891	2	12.04	25	3	6.90	30
	1500 X 500	.72516	2	11.54	21	2	6.46	26
	1800 X 500	.87141	1	11.15	18	1	6.13	23
	800 X 600	.46266	4	12.56	28	5	7.36	33
	1200 X 600	.69766	2	11.62	22	2	6.54	27
	1500 X 600	.87391	1	11.14	18	1	6.12	23
	1800 X 600	1.0502	1	10.76	15	1	5.81	20
	800 X 800	.62016	2	11.88	24	3	6.76	29
	1200 X 800	.93516	1	11.00	17	1	6.01	22
1600	1200 X 1000	1.1727	1	10.54	13	1	5.63	19
	1200 X 400	.46016	5	13.58	31	7	8.14	36
	1500 X 400	.57641	3	13.02	28	4	7.62	32
	1800 X 400	.69266	2	12.58	25	3	7.23	30
	1000 X 500	.48141	4	13.47	31	6	8.03	35
	1200 X 500	.57891	3	13.01	28	4	7.61	32
	1500 X 500	.72516	2	12.47	24	3	7.13	29
	1800 X 500	.87141	1	12.05	21	2	6.77	26
	800 X 600	.46266	5	13.57	31	7	8.12	36
	1200 X 600	.69766	2	12.56	25	3	7.22	29
	1500 X 600	.87391	1	12.04	21	2	6.76	26
	1800 X 600	1.0502	1	11.63	18	1	6.41	23
	800 X 800	.62016	3	12.84	26	4	7.46	31
	1200 X 800	.93516	1	11.89	20	2	6.63	25
	1200 X 1000	1.1727	1	11.39	16	1	6.21	21
	1200 X 1200	1.4102	1	11.00	13	1	5.89	18

PERFORMANCE DATA

FLOW (LPS)	NOMINAL NECK SIZE (mm)	CORE AREA (Sq m)	*0 DEGREE SPREAD*			*22 DEGREE SPREAD*		
			PD (Pa)	THROW (m)	NR	PD (Pa)	THROW (m)	NR
1000	1200 X 600	.69766	3	13.45	27	4	7.87	32
	1500 X 600	.87391	2	12.89	23	2	7.38	28
	1800 X 600	1.0502	1	12.45	20	2	6.99	25
	800 X 800	.62016	3	13.75	29	5	8.14	34
	1200 X 800	.93516	2	12.73	22	2	7.23	27
	1500 X 800	1.1714	1	12.20	19	1	6.78	24
	1800 X 800	1.4077	1	11.79	16	1	6.43	21
	1200 X 1000	1.1727	1	12.20	19	1	6.78	24
	1200 X 1200	1.4102	1	11.78	16	1	6.42	21
	1500 X 1200	1.7664	0	11.29	12	1	6.02	17
2000	1200 X 600	.69766	3	14.30	29	5	8.51	34
	1500 X 600	.87391	2	13.71	26	3	7.97	30
	1800 X 600	1.0502	2	13.24	23	2	7.56	27
	800 X 800	.62016	4	14.62	31	6	8.81	36
	1200 X 800	.93516	2	13.53	24	2	7.82	29
	1500 X 800	1.1714	1	12.97	21	2	7.33	26
	1800 X 800	1.4077	1	12.53	18	1	6.95	23
	1200 X 1000	1.1727	1	12.97	21	2	7.32	26
	1200 X 1200	1.4102	1	12.53	18	1	6.94	23
	1500 X 1200	1.7664	1	12.01	14	1	6.51	19

NOTES ON PERFORMANCE DATA

- The data above are based on tests conducted in a NATA (NATIONAL ASSOCIATION OF TESTING AUTHORITY) Registered Laboratory.
- Performance data are based on Model S219-D supply air registers. Variation of pressure loss and throw from the performance data for other models of supply air registers is negligible. For NR values see table 3 below.
- NR values are based on a room absorption of 6 DB, RE 10-12 watt with damper in full open position. The NR values in table 3 should be added onto the NR values derived from the performance data above for other models of the supply air registers.
- Throw are based on a terminal velocity of 0.25m/s.
- Performance data are based on core area which can be determined for each model from dimensional data on page 3, 5, 7, 9. For easy reference core size is determined as follows:
NON-REMOVABLE CORE MODELS : NOMINAL NECK SIZE – 12.5mm
REMOVABLE CORE MODELS : NOMINAL NECK SIZE – 27mm
- For quick reference pressure loss of supply registers is shown in figure 1 below.

TABLE 3 NR CORRECTION FOR SUPPLY AIR REGISTERS

MODEL	S113	S119	S213	S219
NR CORRECTION	-2	-3	+2	0

- Above data are based on the supply air registers with damper fully open. The effect of dampering is indicated in the following table.

TABLE 4 EFFECT OF DAMPERING

EFFECTIVE DAMPER OPENING	TOTAL RESISTANCE	DB TO BE ADDED
100%	100%	0
80%	150%	5
70%	200%	8
50%	400%	16

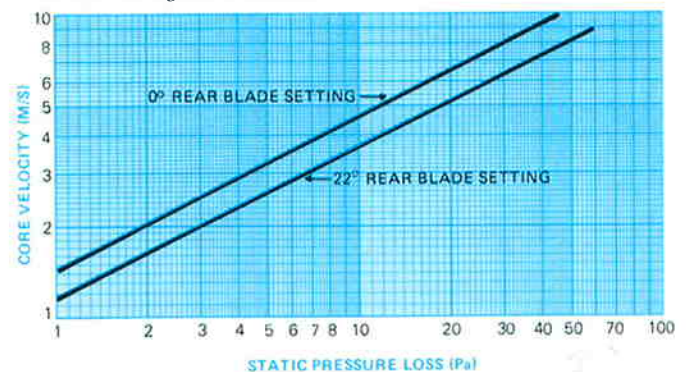


FIGURE 1. PRESSURE LOSS OF SUPPLY AIR REGISTER

TERMINOLOGY

CORE AREA : Total flow area of grille including the blades
CORE VELOCITY : AIR FLOW ÷ CORE AREA
MODEL S119, S219, S113, S213: CORE SIZE = NOM.N.S. – 12.5
MODEL RS119, RS219, RS113, RS213: CORE SIZE = NOM.N.S. – 27

CONVERSION FACTORS

1 m/s = 196.8 ft/min 1 m³/hr = 0.588 ft³/min
 1 l/s = 2.118 ft³/min 1 l/s = 3.6 m³/hr
 1 in wg = 249 Pa

FIELD BALANCING

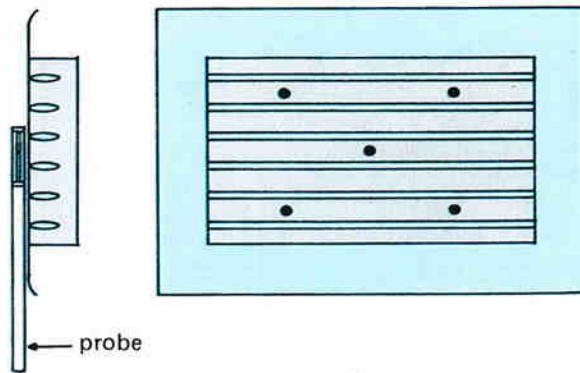


FIGURE 2. FIELD MEASUREMENT

BALANCING PROCEDURES

- STEP (1)** If grille is installed with a damper, set it to full open position.
- STEP (2)** Adjust the deflector blades to the required degree of deflection.
- STEP (3)** Using an anemometer probe, place the centre of the probe where the measuring elements are located between two parallel blades against the air stream (see figure 2).
- STEP (4)** To ensure reliable reading divide the grille into equal sections of approximately 300mm square and take a minimum of 5 measurements per section.
- STEP (5)** Calculate the average air velocity (V_k) by dividing the total of all measurements by the number of measurement.
- STEP (6)** Calculate air quantities as follows:-

$$CMH = V_k \text{ (in m/s)} \times A_k \times 3600$$
 or
$$LPS = V_k \text{ (in m/s)} \times A_k \times 1000$$
 where A_k is obtained from figure 3

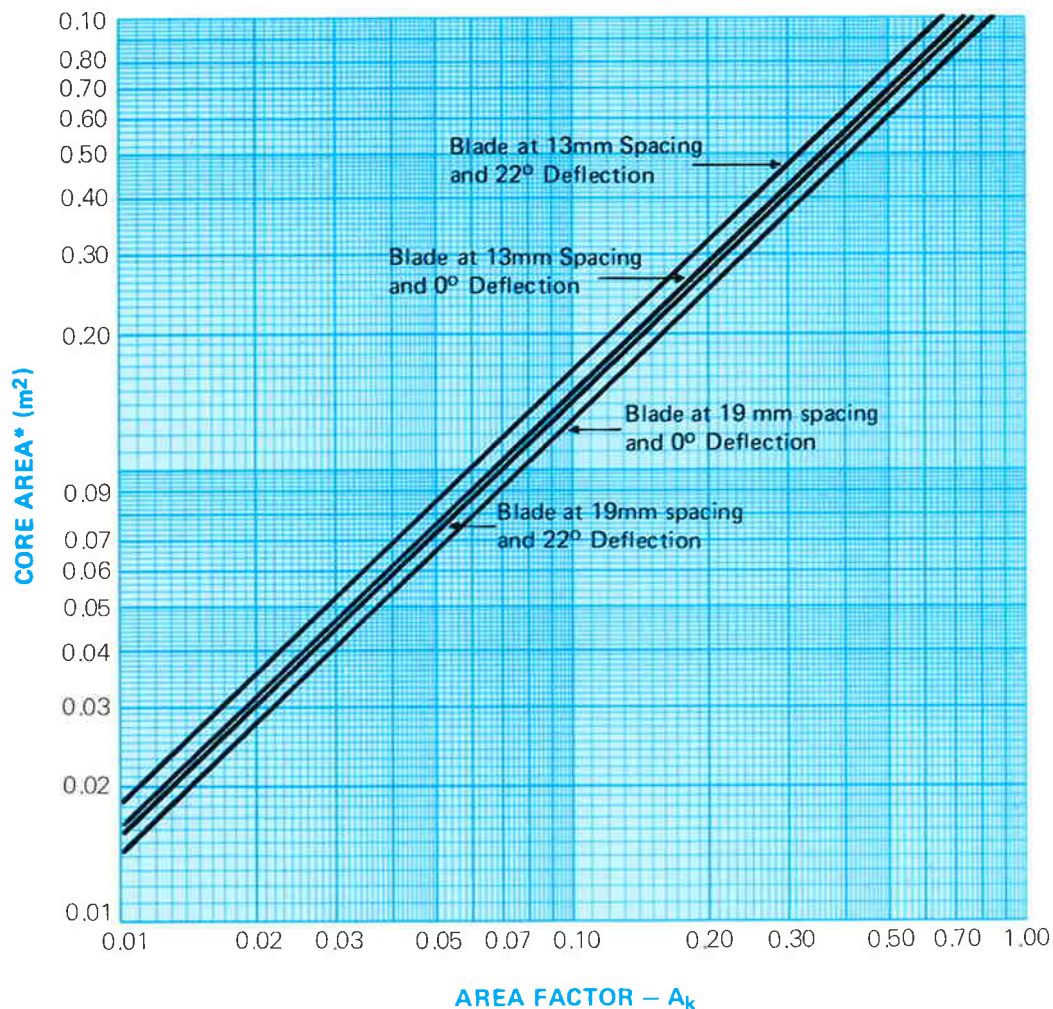
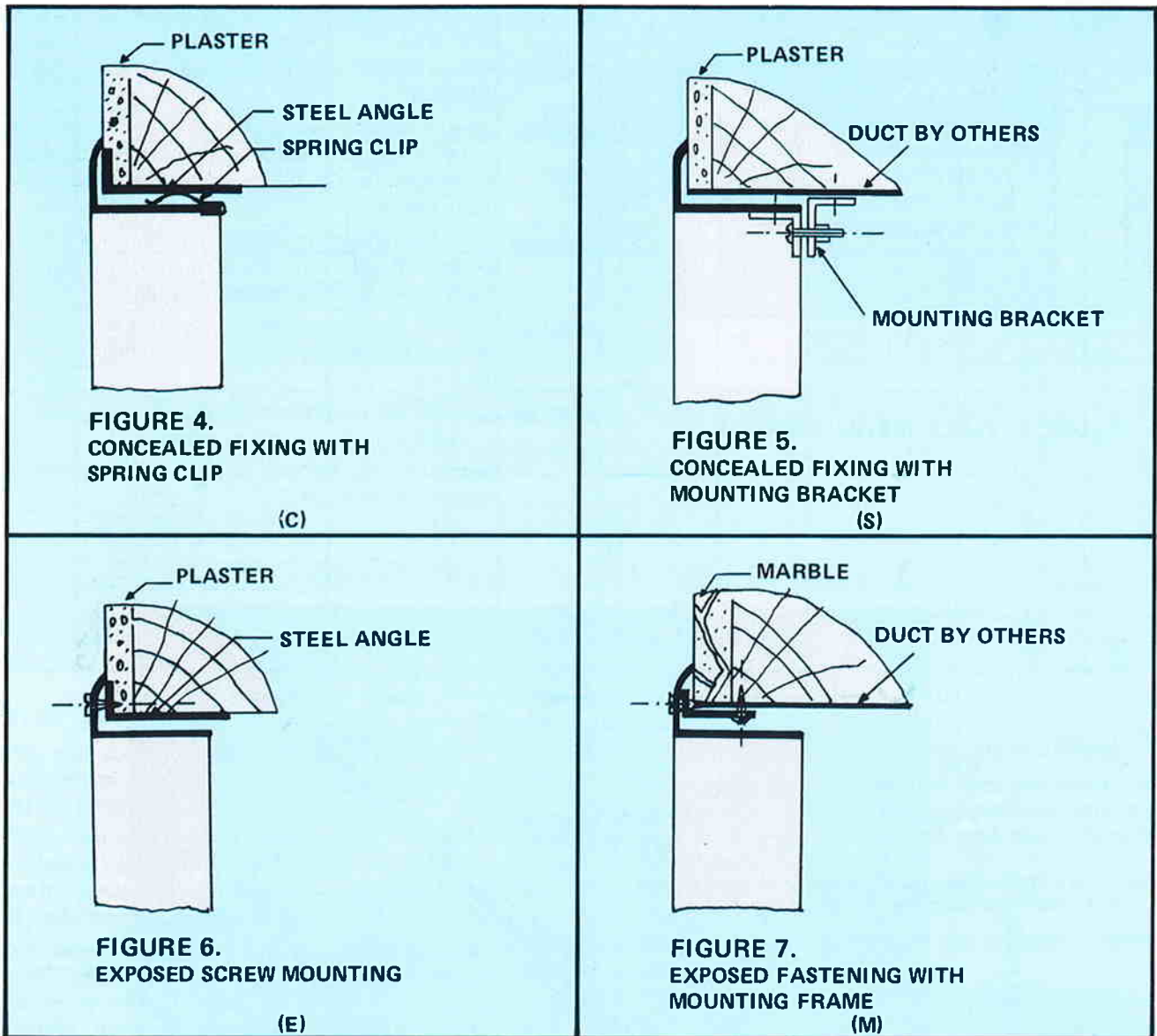


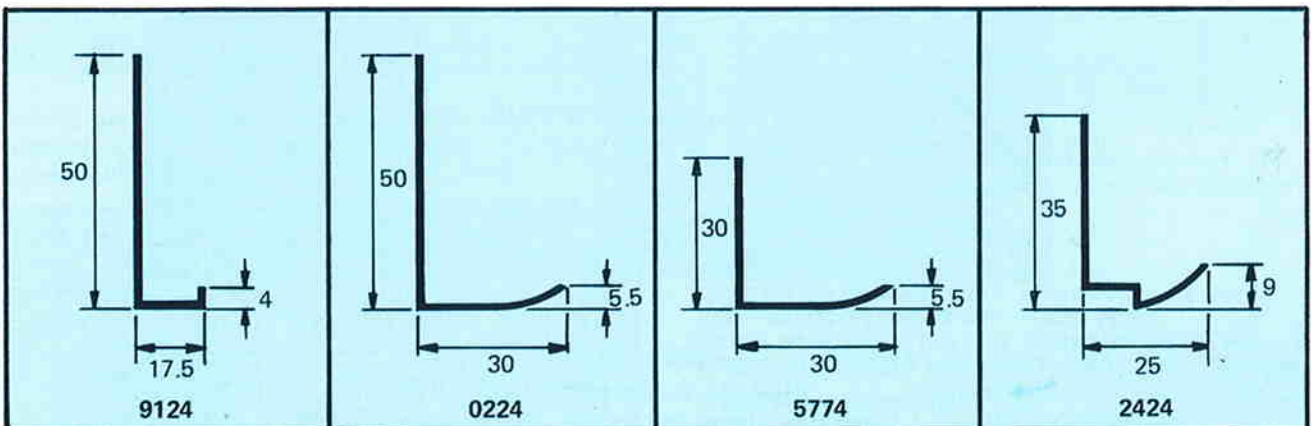
FIGURE 3. BALANCING DATA

* core area is based on core size — See note 6 on page 16

INSTALLATION DETAILS



FRAMES STYLES

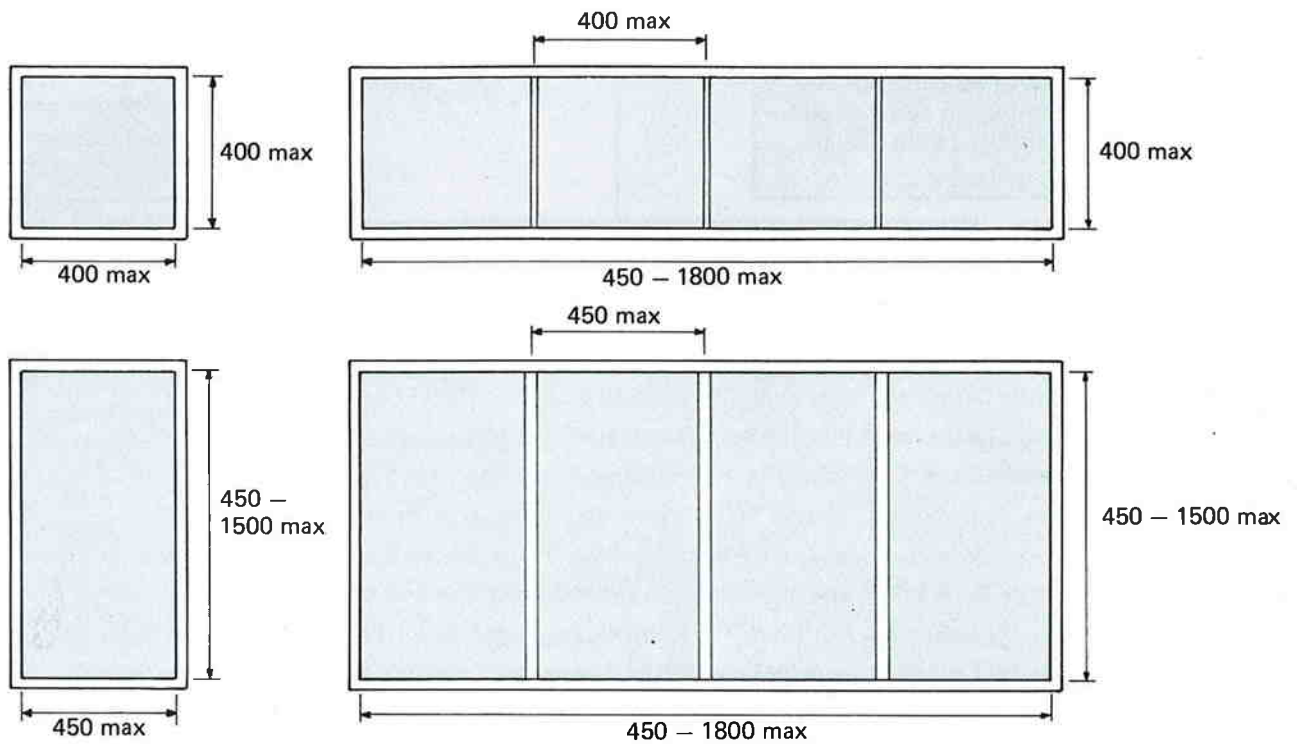


CONSTRUCTION DETAILS

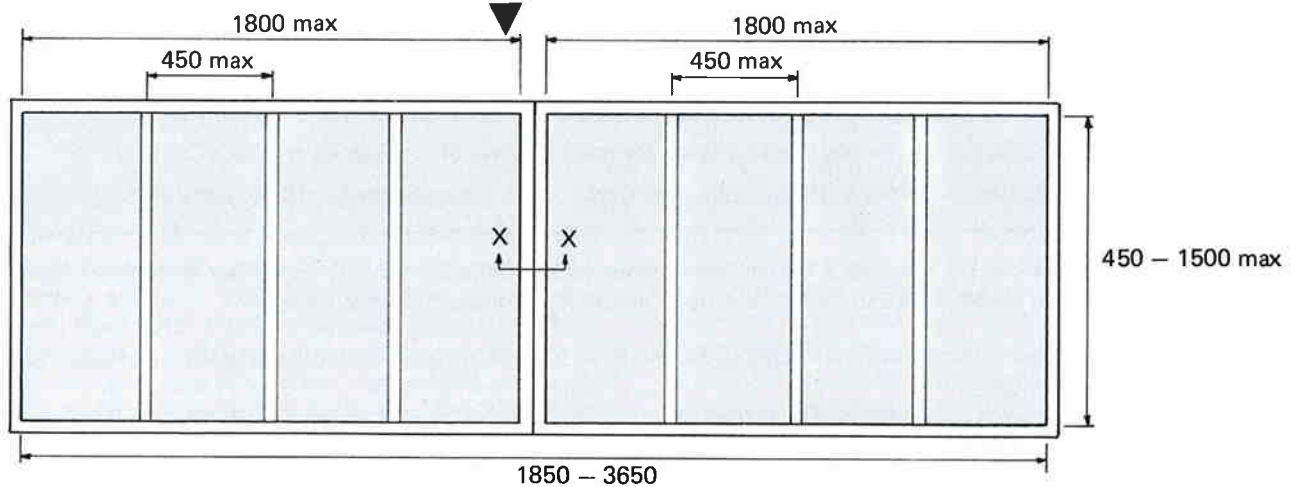
Min Size : 100 x 100

Max Size : 1800 x 1500 Single Section
 3600 x 1500 Two Sections
 4340 x 1500 Three Sections
 3600 x 3000 Four Sections

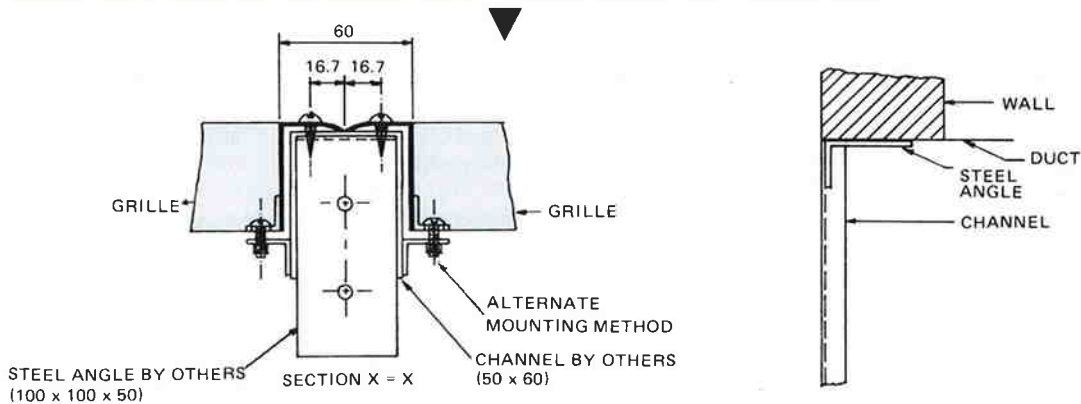
Special Size: Consult factory or our nearest representatives.



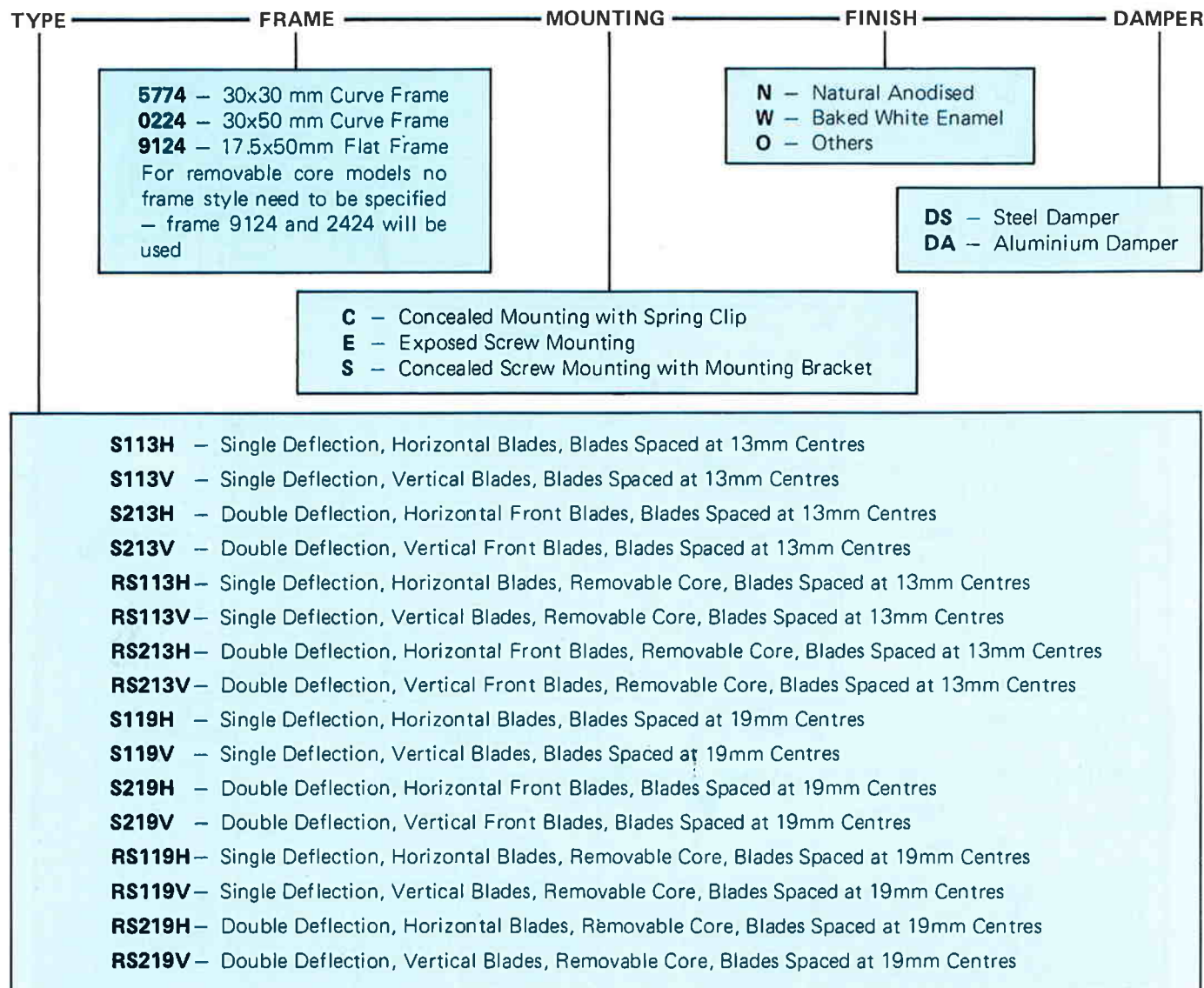
GRILLES AND REGISTERS HAVING MORE THAN ONE SECTION



JOINT DETAILS OF GRILLES WITH MORE THAN ONE SECTION



HOW TO SPECIFY



EXAMPLE: S219V-0224-E-W-DS refers to a factory baked white double deflection supply air register with 30mm curve frame, vertical front blades spaced at 19mm, and steel damper for exposed screw mounting.

NOTE: 1. Where no frame style is specified, frame 0224 and 5774 will be supplied for double deflection and single deflection models respectively.
 2. Steel dampers are supplied painted matt black.
 3. Aluminium dampers are supplied in mill finish.

WARRANTY

CONNOLS-AIR (S) PTE LTD (the "Company"), SINGAPORE warrants that every product manufactured and sold by them and described herein will be free from defects in material and workmanship under normal use and service for a period of one year after purchase. The Company's obligation under this warranty shall be limited to replacing any such product which proves to be defective in workmanship or material under normal use and service within such period. The warranty shall not apply to component parts or accessories, which are covered only by the warranty of the manufacturer thereof. Any improper use, including but not limited to, operation after the discovery of defective or worn parts,

operation beyond rated capacity, substitution of parts not approved by the Company, neglect, accident or any alteration or repair by others in such a manner as in the Company's opinion materially and adversely affects the products, shall void this Warranty.

The foregoing warranty is exclusive and is expressly in lieu of any other warranties elsewhere stated, express or implied, including any implied warranty or merchantability or fitness for a particular purpose or any other purpose. In the event that such implied warranties may be disclaimed entirely for any reason, such implied warranties shall be effective only

for a period of one year after purchase. No person is authorized to assume for the Company any other liability with respect to any product sold by the Company, nor is any employee or representative authorized to alter this warranty in any way or grant any other warranty, unless such change is authorized in writing by an officer of the Company at its home office. The Company shall have no liability whatsoever in any event for payment of incidental or consequential damages, including without limitation, installation or delay costs or damages for injury to persons

or property. The Company *makes no other representation or warranty of any kind, express or implied, in fact or in law, including without limitation, the warranty of merchantability or the warranty of fitness for a particular purpose, other than the limited warranty set forth above.* (Every claim under this warranty shall be deemed waived unless submitted in writing, and received by the Company within thirty (30) days of the date to which each claim relates, is discovered or should have been discovered.

SPECIFICATIONS

Single Deflection Type With 19mm Blade Spacing

Supply air grilles shall be of the adjustable single deflection type similar to Model S119H or S119V as manufactured by OLS. Blade and frame shall be constructed of extruded aluminium. Blades shall be of aerofoil shape spaced at 19mm centres and fixed to the frame with plastic bushing to prevent rattling. Using steel wire as a means of preventing rattling of the blades is not acceptable. Where the wall does not permit fastening directly to the wall, removable core models shall be used. Removable core models shall have matching mounting frame specially designed for this purpose. Removable core supply grille shall be similar to OLS made Model RS119H or RS119V. Rectangular grilles with height smaller than 300mm shall have adjustable vertical blades. Volume damper shall be easily adjustable from the face of the grille. Damper is not required if the supply air grille is attached to a fan coil unit. Where the duct take-off to the supply air grille is shorter than 2 times the larger dimension of the grille an air extractor shall be used at the duct take-off to ensure uniform air flow at the grille outlet. All supply air grilles performance shall be rated in a recognised NATA registered Independent Testing Laboratory.

Single Deflection Type With 13mm Blade Spacing

Supply air grilles shall be of the adjustable single deflection type similar to Model S113H or S113V as manufactured by OLS. Blade and frame shall be constructed of extruded aluminium. Blades shall be of aerofoil shape spaced at 13mm centres and fixed to the frame with plastic bushing to prevent rattling. Using steel wire as a means of preventing rattling of the blades is not acceptable. Where the wall does not permit fastening directly to the wall, removable core models shall be used. Removable core models shall have matching mounting frame specially designed for this purpose. Removable core supply grille shall be similar to OLS made Model RS113H or RS113V. Rectangular grilles with height smaller than 300mm shall have adjustable vertical blades. Volume damper shall be easily adjustable from the face of the grille. Damper is not required if the supply air grille is attached to a fan coil unit. Where the duct take-off to the supply air grille is shorter than 2 times the larger dimension of the grille an air extractor shall be used at the duct take-off to ensure uniform air flow at the grille outlet. All supply air grilles performance shall be rated in a recognised NATA registered Independent Testing Laboratory.

Double Deflection Type With 19mm Blade Spacing

Supply air grilles shall be of the adjustable double deflection type similar to Model S219H or S219V as manufactured by OLS. Blade and frame shall be constructed of extruded aluminium. Blades shall be of aerofoil shape spaced at 19mm centres and fixed to the frame with plastic bushing to prevent rattling. Using steel wire as a means of preventing rattling of the blades is not acceptable. Where the wall does not permit fastening directly to the wall removable core models shall be used. Removable core models shall have matching mounting frame specially designed for this purpose. Removable core supply grille shall be similar to OLS made model RS219H or RS219V. Rectangular grilles with height smaller than 300mm shall have adjustable vertical front blades and horizontal rear blades. Volume damper shall be easily adjustable from the face of the grille. Damper is not required if the supply air grille is attached to a fan coil unit. Where the duct take-off to the supply air grille is shorter than 2 times the larger dimension of the grille an air extractor shall be used at the duct take-off to ensure uniform air flow at the grille outlet. All supply air grilles performance shall be rated in a recognised NATA registered Independent Testing Laboratory.

Double Deflection Type With 13mm Blade Spacing

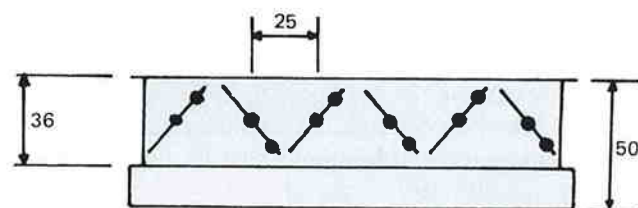
Supply air grilles shall be of the adjustable double deflection type similar to Model S213H or S213V as manufactured by OLS. Blade and frame shall be constructed of extruded aluminium. Blades shall be of aerofoil shape spaced at 13mm centres and fixed to the frame with plastic bushing to prevent rattling. Using steel wire as a means of preventing rattling of the blades is not acceptable. Where the wall does not permit fastening directly to the wall removable core models shall be used. Removable core models shall have matching mounting frame specially designed for the purpose. Removable core supply grille shall be similar to OLS made model RS213H or RS213V. Rectangular grilles with height smaller than 300mm shall have adjustable vertical front blades and horizontal rear blades. Volume damper shall be easily adjustable from the face of the grille. Damper is not required if the supply air grille is attached to a fan coil unit. Where the duct take-off to the supply air grille is shorter than 2 times the larger dimension of the grille an air extractor shall be used at the duct take-off to ensure uniform air flow at the grille outlet. All supply air grilles performance shall be rated in a recognised NATA registered Independent Testing Laboratory.

ACCESSORIES

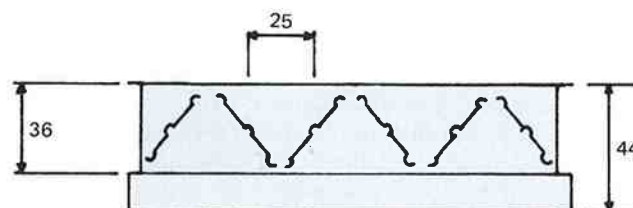
DAMPER

Opposed blade dampers are used with supply and return grilles for control of air volume. Type DS dampers are constructed of zinc coated steel and painted to matt black finish while type DA dampers of extruded aluminium in mill finish.

Opposed blade dampers used with grilles should only be used for fine balancing. Drastic throttling of the damper at the grille will result in considerable db increase in noise level. Majority of the balancing should be provided by damper upstream in the supply duct. Figure 7 shows a damper installed in a branch duct leading to supply air grilles. The remote location of the dampering allows for acoustical lining before the diffuser.



TYPE DA ALUMINIUM DAMPER



TYPE DS STEEL DAMPER

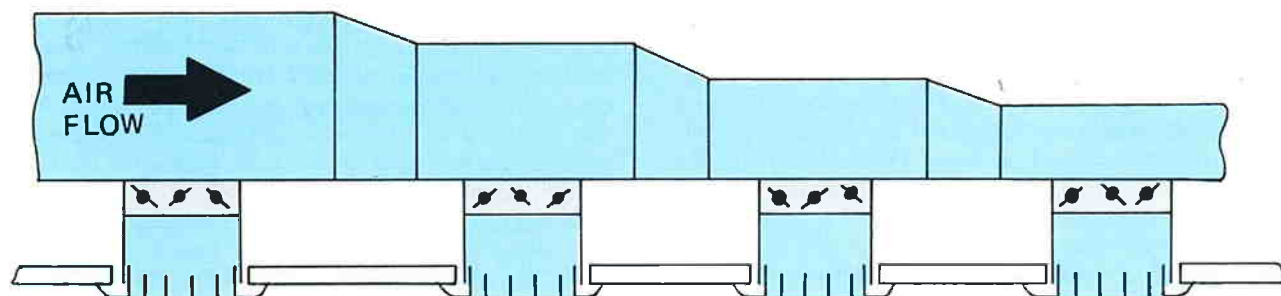
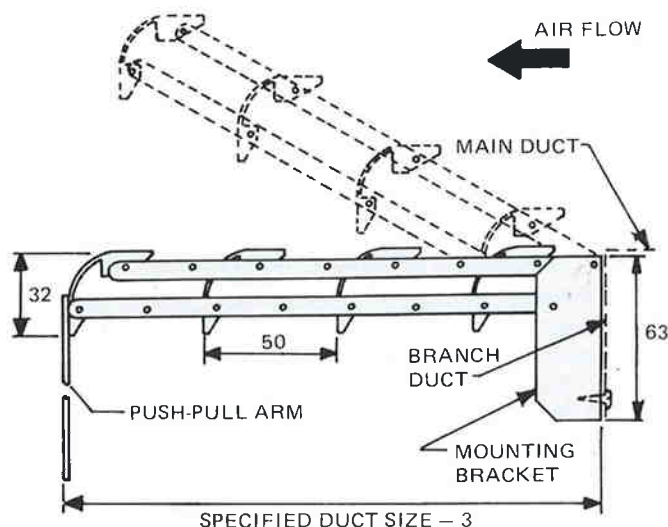


FIGURE 8. INSTALLATION OF DAMPER AT BRANCH TAKE-OFF

AIR EXTRACTOR

Series E25 and E50 extractors are constructed of pre-galvanised steel vanes assembled at 25mm centres (Model E25) or 50mm centres (Model E50) to provide smooth efficient turning of air flow from one duct to another. The extractor vanes are gang-operated and synchronized to remain parallel with air flow regardless of the extractors angle. Installed at the take-off on the downstream side the air extractors extract, equalize and provide volume control of air flow into air outlets, reducing air turning pressure loss and ensuring a quieter system operation – sound levels of air outlets can be reduced considerably due to the absence of turbulence in the duct and localised high velocities in the grilles. When close the blades of Model E25 air extractor will overlap for full shut-off. The air extractor may be furnished with appropriate operator for adjustment after installation.

Type 1 extractor is furnished with a push-pull arm, type 2 extractor with a linkage for an external operator and type 3 extractor with a worm gear operator.



MODEL E50 TYPE 1 EXTRACTOR

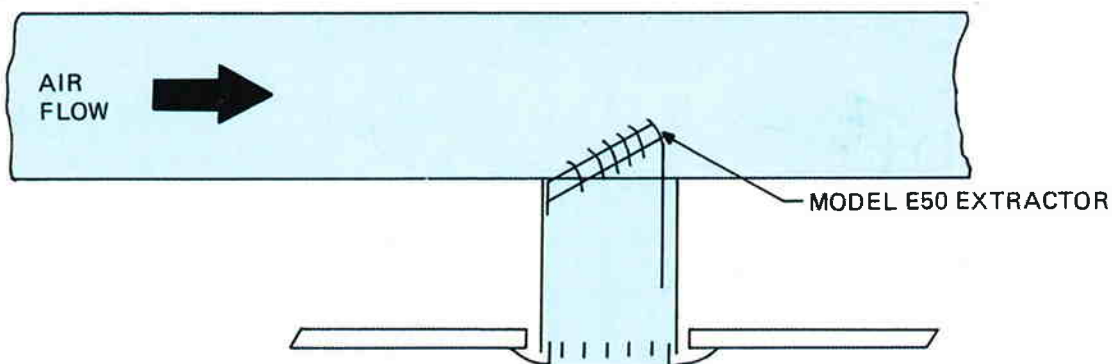
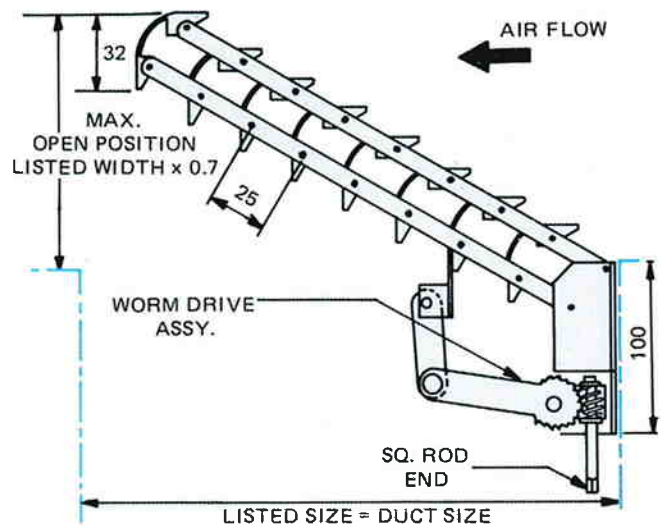
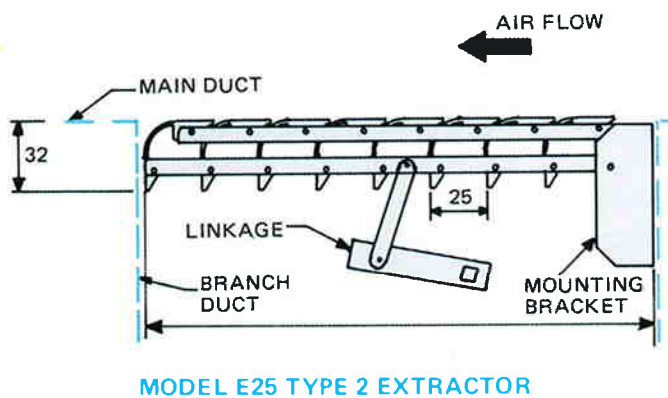


FIGURE 9. INSTALLATION OF EXTRACTOR AT BRANCH TAKE-OFF TO SUPPLY AIR GRILLE

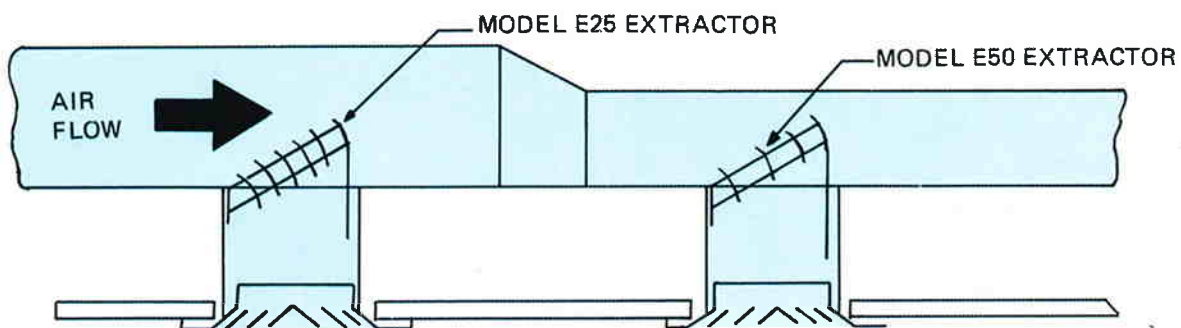
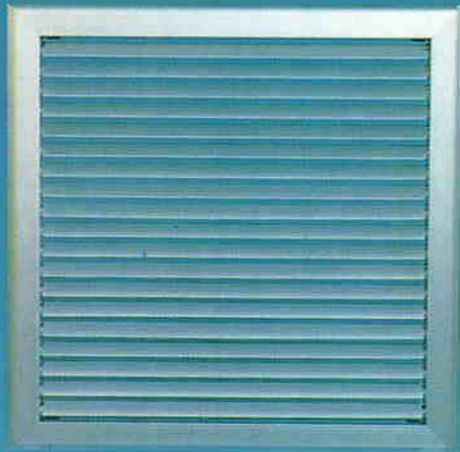
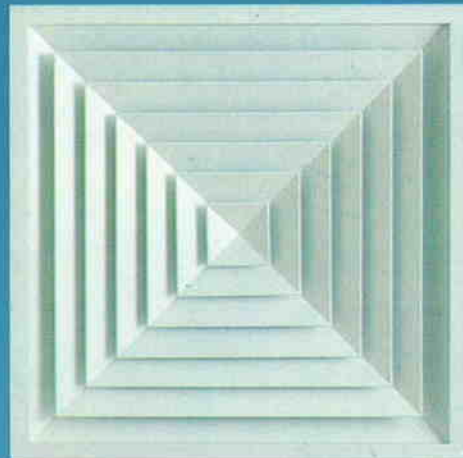


FIGURE 10. INSTALLATION OF EXTRACTOR AT BRANCH TAKE-OFF TO SUPPLY CEILING DIFFUSER

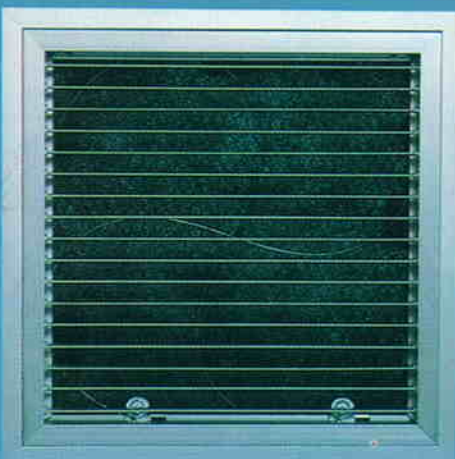
OTHER PRODUCTS



R 245H



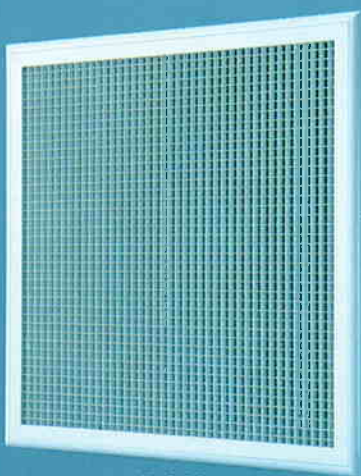
MF 4-Way



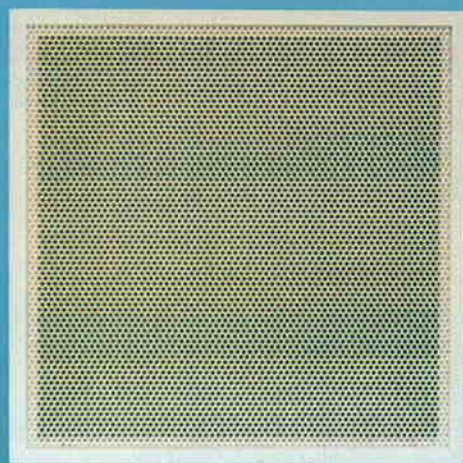
FR200H



MF 3-Way



RG12



P F



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