

**COLMAN**

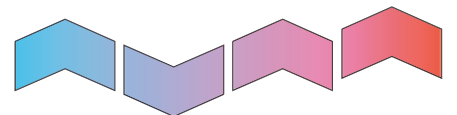
ENGINEERED AIR DISTRIBUTION

**EYELASH DIFFUSERS**

**E SERIES**



**E**  
SERIES



# EYELASH DIFFUSERS

## E SERIES

QUALITY AND EFFICIENCY WITHOUT  
COMPROMISE



### Application

Colman's E Series range of aluminium curved blade diffusers have been designed to provide an attractive and flexible solution to a wide variety of air distribution requirements. With a wide variety of air patterns available, together with either fixed or adjustable blade patterns, the range can be matched to most building environments, in supply air applications.

### Description

The range comprises two basic styles, a fixed blade (EKE) and an adjustable blade (EYE). All frames and blades are manufactured from high quality aluminium extrusions and galvanised steel volume control dampers are available operable through the face of the diffuser. With a fully welded frame, the units are available in square or rectangular sizes starting from 150mm x 75mm and increasing in increments of 25mm to a maximum single piece construction of 1200mm x 600mm. The units can be supplied in any of seven possible air pattern arrangements giving 1, 2, 3 or 4 way discharge. Minimum sizes for different core styles are shown on page 3.

The EYE is also available as a continuous run and where this is required the maximum single piece construction is 1800mm long and 300mm high. Hairline butt joints held by special alignment strips ensure that a continuous unbroken run is achieved for lengths greater than this.



**E Series Diffusers**

### Fixings

Both EKE and EYE versions are compatible with most types of ceiling systems, with the EKE having a flat flange and the EYE a curved flange. Fixings are either via countersunk screws through the diffuser flange (EKE) or via universal mounting brackets (EYE).

### Finish

The diffusers are available as standard, powder coated in RAL 9010 Matt White. Please refer to the product coding section within this brochure for a list of other standard finishes. Special finishes are available on request.

# Ceiling Diffusers - curved blade

Model EKE Fixed blade diffusers - 1 Way



Model EYE Adjustable blade diffuser - 4 Way with damper



## ENK/ENY Plenum Boxes

Colman manufacture a range of high quality, galvanised sheet steel plenum boxes to suit the E series diffusers. Designed to equalise the air distribution across the diffuser these plenums are available in standard configuration or purpose made to suit different ceilings, bulkheads or air volumes. For supply air applications they will contain equalising mesh to spread the air across the full diffuser and plenums are available in lined and unlined versions. Standard plenum sizes are detailed within this brochure and plenums are supplied with a single circular entry spigot per plenum as standard, oval or rectangular versions are also available. Diffuser fixing into the neck of the plenum is via screws or rivets for EKE as this product is not suitable for the Colman universal mounting bracket method, which can only be used on EYE diffusers.

## Optional air patterns

<p><b>4 way</b></p> <p>Order Code <b>A</b></p> <p>MIN SIZE 300 x 150</p>	<p><b>3 way</b></p> <p>Order Code <b>B</b></p> <p>MIN SIZE 300 x 150</p>	<p><b>2 way opposite</b></p> <p>Order Code <b>C</b></p> <p>MIN SIZE 150 x 150</p>	<p><b>1 way</b></p> <p>Order Code <b>D</b></p> <p>MIN SIZE 150 x 75</p>
<p><b>3 way</b></p> <p>Order Code <b>X</b></p> <p>MIN SIZE 225 x 150</p>	<p><b>3 way</b></p> <p>Order Code <b>Y</b></p> <p>MIN SIZE 225 x 150</p>	<p><b>2 way corner</b></p> <p>Order Code <b>Z</b></p> <p>MIN SIZE 225 x 150</p>	<p>All sizes shown are width x height.</p> <p>'H' denotes height across blades = 75mm minimum and 300mm maximum.</p> <p>Minimum blade length is 150mm.</p>

# Options and Order Codes

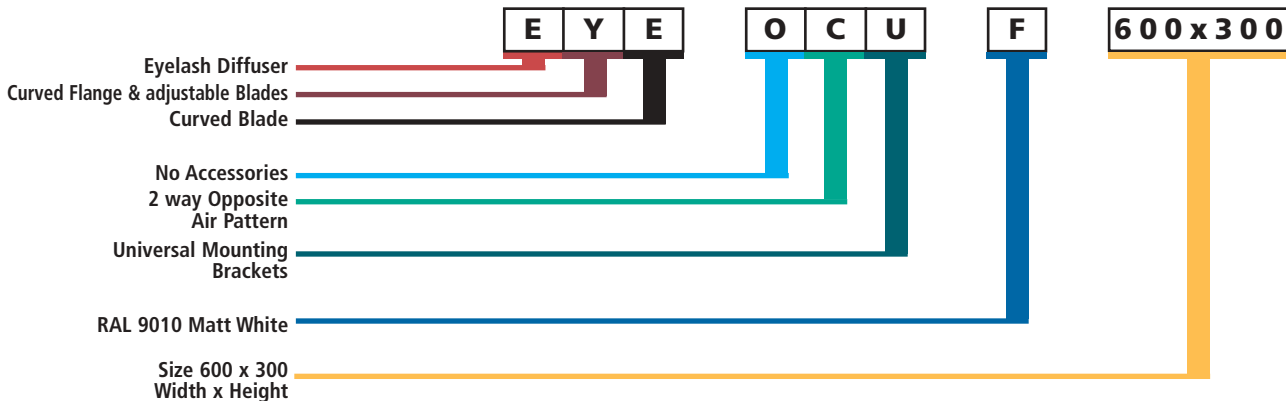
## Diffusers

1	2 FRAME	3 BLADE TYPE	4 ACCESSORIES	5 ARRANGEMENT	6 FIXING	7 FINISH
<b>E</b>	<b>K</b> Flat Flange for fixed core <b>Y</b> Curved flange for adjustable core 1 Special	<b>E</b> Curved eyelash blade 1 Special	<b>O</b> None <b>V</b> Key operated opposed blade damper 1 Special	<b>O</b> None <b>A</b> 4 way pattern <b>B</b> 3 way pattern <b>C</b> 2 way opposite <b>D</b> 1 way pattern <b>E</b> 1 way intermediate flange <b>F</b> 1 way RH end cap <b>G</b> 1 way LH end cap <b>H</b> 2 way intermediate <b>I</b> 2 way RH end cap <b>X</b> 3 way pattern <b>Y</b> 3 way pattern (2 squares / 1 rectangle) <b>Z</b> 2 way corner pattern 1 Special	<b>O</b> None <b>D</b> Extended universal mounting brackets - Y flange only <b>G</b> Screw thru flange <b>U</b> Universal mounting brackets - Y flange only 1 Special	<b>F</b> RAL9010 Matt White Other standard colours available ; Mill Finish <b>O</b> BS00E55 Gloss White <b>C</b> BS00E55 Satin White <b>H</b> BS00E55 Matt White <b>D</b> RAL9010 Gloss White <b>E</b> RAL9010 Satin White <b>G</b> RAL9006 Aluminium <b>3</b> Special Colours available on request 1

Note: Option D for use with VCD's

Note: The items shown in red print above and below and in the order code example are the standard options for this product. Unless shown otherwise on any quotation or order the units will be supplied in this configuration.

### Example of Order Codes



## Plenum Boxes

1	2 LINING	3 INSTALLATION METHOD	4 ACCESSORIES	5 ARRANGEMENT	6 SPIGOT TYPE	7 SPIGOT SIZE (DIA or SQ - all in mm)
<b>E</b>	<b>L</b> Lined <b>N</b> Unlined 1 Special	<b>O</b> Straight Edge <b>U</b> Universal Bracket 1 Special	<b>O</b> None <b>M</b> Mono blade cord operated damper 1 Special	<b>S</b> Supply <b>E</b> Extract 1 Special	<b>R</b> Round - side entry <b>S</b> Square - side entry <b>T</b> Round - Top entry <b>W</b> Round - flush with top of unit <b>X</b> Square - flush with top of unit <b>Y</b> Square - Top Entry 1 Special	<b>A</b> 100 <b>B</b> 125 <b>C</b> 150 <b>D</b> 200 <b>E</b> 250 <b>F</b> 300 <b>G</b> 350 <b>H</b> 400 <b>J</b> 450 <b>K</b> 500 <b>L</b> 160 <b>M</b> 180 <b>N</b> 315 <b>O</b> 355 1 Special  All standard spigots 75mm deep

Note: Option U only with Y frame

Note: Max size mono blade Ø400 and 350 sq.

Note: E Series are recommended on supply air only

### SPECIFICATION:

The E Series eyelash diffuser is manufactured from 1.5mm extruded aluminium to BS1474/6063T6. Outer frames are fully welded and have a flat flange (EKE) or curved flange (EYE). The inner blades are fixed (EKE) or adjustable (EYE) and are mounted on a 25mm pitch. Frames incorporate keyways for Universal Mounting Brackets (EYE).

The following pages give details on how to correctly select the E Series Diffusers, together with a worked example. Please read the notes carefully and contact us should you have any queries.

**Table 1: Diffuser length correction figures**

Active Diffuser Length (m)	Factor	NC Correction
0.3	0.52	-5
0.6	0.88	-2
0.9	0.98	0
1	1	0
1.2	1.04	1
1.5	1.09	2
1.8	1.14	3
2.1	1.17	3
2.4	1.19	4
2.7	1.2	4
3.0+	1.21	5

**Table 2: Spigot velocity against NC rating**

Sound Rating NC	Spigot Velocity m/s
25	2.5
30	3
35	3.5
40	4.5

**Table 3: Minimum cross section areas for ENY/ENK plenums**

Diffuser Height mm	Plenum Cross sectional area m <sup>2</sup> /m
75	0.024
100	0.032
125	0.04
150	0.046
200	0.063
225	0.072
300	0.095

## Typical Selection

Given: Zone Size of 6m x 6m x 2.7m high  
 Required NC level of 35  
 9 Air changes per Hour

### 1) Calculate Air Volume required: (When not specified)

Zone Volume = Length - 6m x Width - 6m x Height - 2.7m = 97.2m<sup>3</sup>  
 Multiplied by the required number of air changes - 9 = 874.8m<sup>3</sup>/hr  
 Divided by the number of seconds per hour - 3600 = 0.243m<sup>3</sup>/s

### 2) Decide position of Diffuser:

Assuming the diffuser is positioned centrally in the zone, a 4 way throw of 3m would be required to fully distribute the air in the room.  
 To determine the performance of a 4 way diffuser, divide the required volume by the No. of ways throw. i.e. 0.243m<sup>3</sup>/s ÷ 4 = 0.06m<sup>3</sup>/s.

### 3) Select Diffuser:

From the performance data given on page 6, a 300 x 150 1 way diffuser with a volume of 0.06m<sup>3</sup>/s would give a throw of between 2.4m and 3.1m, at NC 20, as selections should be based on mid range, this diffuser would be suitable in this instance.  
 Nominal grille size would be 4 No. @ 300 x 150mm, arranged as shown on page 3, giving a nominal total size of 600 x 300mm.

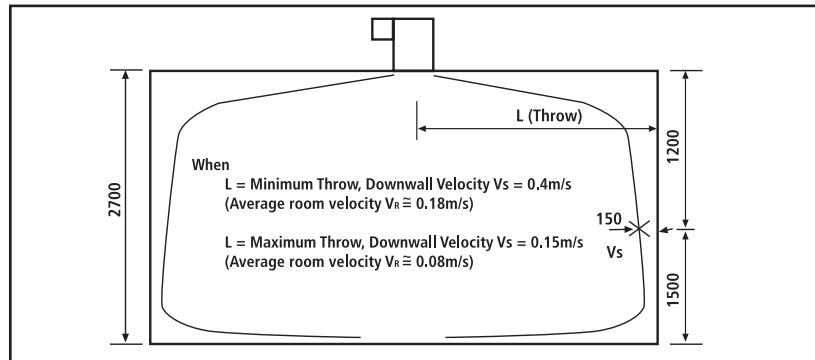
### 4) Select Spigot Size:

Spigot Area = Total volume ÷ Maximum allowed velocity  
 0.24 ÷ 3.5m/s = 0.068 m<sup>2</sup>

Area of 300mm Dia side entry spigot =  $\pi r^2$  = 3.142 x 0.15<sup>2</sup> = 0.071 m<sup>2</sup>

Therefore the plenum would be fitted with a 300mm Dia side entry spigot.

**Note:** Although the basic selection is now made the points shown on the right should be checked.



### Throw

Throw and NC data is given for 1m active lengths of EYE continuous diffuser. For other lengths use the correction figures given in table 1. If two diffusers are to throw towards each other, select an air volume that gives a maximum throw equal to half the distance between the two.

### Plenums

Select the appropriate spigot velocity to match the NC rating required, as per table 2.

The plenum sizes shown in the brochure have been selected for the minimum recommended size for even distribution across the diffuser for a centre fed, constant cross-section box. The minimum cross-sectional areas are shown in table 3. Plenum height can be calculated as shown in check No.3 below.

### Pressure Drop

The pressure drop is given for the diffuser only.

### Note

The tabulated performance data is indicative of the performance in one direction only, therefore each direction of a multiway diffuser must be calculated separately. Where equal throws are required from 3 or 4 way diffusers, each area must maintain a ratio of 2 : 1 (Width x Height). Specific selections may require confirmation.

### Check No. 1 - Ceiling Height

For ceiling heights greater than 2.7m, the throw is reduced by 5% for each additional 0.3m up to a maximum ceiling height of 4.3m.  
 Where there is no ceiling effect throw is reduced by approximately 40%.

### Check No. 2 - NC Level

To ensure that the air velocity in the spigot does not cause excessive noise the figures given in Table 2 should be noted.

i.e. Total volume ÷ area of spigot = Velocity  
 So - 0.24 ÷ 0.071 = 3.38m/s

From Table 2 this gives NC 35, which is within the specified limit.

### Check No. 3 - Plenum Height

If site conditions dictate a height limitation, the following formula can be used to check the minimum recommended height for the plenums. If these are found to be too high please contact the sales office for advice on alternative plenum arrangements.

Take the minimum cross sectional area from Table 3 and multiply by the plenum width (see back page)

$$0.095 \times 0.600 = 0.057\text{m}^2$$

Height = cross sectional area ÷ diffuser height (see back page)

$$0.057 \div 0.300 = 0.190\text{m}$$

Plus clearance for spigot and equalising mesh = 0.100m  
 Gives an overall minimum height = 0.29m

This height will not accommodate the required spigot size, plenum height will therefore be, spigot size plus 175mm.

# EYE & EKE-SUPPLY

Air Volume	Diffuser size		Neck Velocity	Pressure Drop	Throw m		Sound Rating	
	m³/s	Width			Height	Min.		Max.
0.025	150	100	1.67	10	2.6	4.0	20	
	200	100	1.25	6	2.0	3.2	18	
	100	150	1.10	4	1.8	2.4	-	
0.035	200	100	1.75	12	3.0	4.6	25	
	150	150	1.56	8	2.7	4.0	20	
	350	100	1.17	5	2.2	2.8	18	
	300	150	0.80	2	1.8	2.4	-	
	450	100	0.80	2	1.8	2.4	-	
0.047	150	150	2.00	16	4.0	5.2	30	
	200	150	1.50	8	3.1	4.3	24	
	300	100	1.50	8	3.1	4.4	24	
	300	150	1.00	4	2.4	3.1	20	
	450	100	1.00	4	2.4	3.1	20	
	300	200	0.75	2	2.1	2.7	-	
	250	250	0.75	2	2.1	2.7	-	
	450	200	0.50	1	1.5	2.1	-	
	350	250	0.50	1	1.5	2.1	-	
	300	300	0.50	1	1.5	2.1	-	
	0.071	450	100	1.50	8	3.7	4.9	26
300		150	1.50	8	3.7	4.9	26	
350		200	1.00	4	2.7	3.7	22	
450		150	1.00	4	2.7	3.7	22	
300		300	0.75	2	2.4	3.1	18	
450		200	0.75	2	2.4	3.1	18	
600		150	0.75	2	2.4	3.1	18	
550		250	0.50	1	1.2	2.1	-	
450		350	0.50	1	1.2	2.1	-	
0.94		300	150	2.00	16	4.9	6.7	31
	450	100	2.00	16	4.9	6.7	31	
	250	250	1.50	8	4.0	5.2	27	
	300	200	1.50	8	4.0	5.2	27	
	600	100	1.50	8	4.0	5.2	27	
	300	300	1.00	4	2.7	4.0	23	
	450	200	1.00	4	2.7	4.0	23	
	600	150	1.00	4	2.7	4.0	23	
	400	300	0.75	2	2.4	3.1	20	
	500	250	0.75	2	2.4	3.1	20	
	600	300	0.50	1	1.8	2.4	-	
	0.118	300	200	2.00	16	5.2	7.0	33
		400	150	2.00	16	5.2	7.0	33
300		250	1.50	8	4.3	5.5	28	
500		150	1.50	8	4.3	5.5	28	
450		250	1.00	4	3.1	4.3	26	
750		150	1.00	4	3.1	4.3	26	
500		300	0.75	2	2.7	3.7	21	
750		200	0.75	2	2.7	3.7	21	
1000		150	0.75	2	2.7	3.7	21	
900		250	0.50	1	1.8	2.4	18	
750		300	0.50	1	1.8	2.4	18	
0.141		400	200	2.00	16	5.5	7.3	34
		300	300	1.50	8	4.3	6.1	28
	600	150	1.50	8	4.3	6.1	28	
	500	250	1.00	4	3.4	4.6	25	
	900	150	1.00	4	3.4	4.6	25	
	900	300	0.50	1	2.1	2.7	20	

Air Volume	Diffuser size		Neck Velocity	Pressure Drop	Throw m		Sound Rating
	m³/s	Width			Height	Min.	
0.165	400	200	2.00	16	5.8	7.6	35
	1000	100	1.50	8	4.6	6.4	29
	550	200	1.50	8	4.6	6.4	29
	350	300	1.50	8	4.6	6.4	29
	800	200	1.00	4	3.4	4.6	24
	1000	150	1.00	4	3.4	4.6	24
0.188	1000	300	0.50	1	2.1	2.7	20
	600	150	2.00	16	6.1	7.9	36
	300	300	2.00	16	6.1	7.9	36
	1200	100	1.50	8	4.9	6.7	30
	600	200	1.50	8	4.9	6.7	30
	400	300	1.50	8	4.9	6.7	30
	700	250	1.00	4	3.7	4.9	24
	1200	150	1.00	4	3.7	4.9	24
	800	300	0.75	2	2.7	4.0	23
	1200	300	0.50	1	2.1	2.7	20
0.212	500	200	2.00	16	6.1	8.5	38
	350	300	2.00	16	6.1	8.5	38
	900	150	1.50	8	4.9	6.7	32
	550	250	1.50	8	4.9	6.7	32
	700	300	1.00	4	3.7	4.9	25
	1000	200	1.00	4	3.7	4.9	25
	900	300	0.75	2	3.1	4.3	24
	0.234	750	150	2.00	16	6.4	8.5
400		300	2.00	16	6.4	8.5	40
600		250	1.50	8	5.2	7.0	34
500		300	1.50	8	5.2	7.0	34
1200		200	1.00	4	4.0	5.2	26
750		300	1.00	4	4.0	5.2	26
1200		250	0.75	2	3.1	4.3	24
0.282	900	150	2.00	16	6.7	9.1	42
	450	300	2.00	16	6.7	9.1	42
	600	300	1.50	8	5.5	7.3	35
	900	300	1.00	4	4.0	5.2	27
0.329	1000	200	1.50	8	5.8	7.6	35
	700	300	1.50	8	5.8	7.6	35
	1200	250	1.00	4	4.3	5.5	28
	1400	300	0.75	2	3.4	4.6	26
0.376	1600	150	1.50	8	6.1	7.9	36
	800	300	1.50	8	6.1	7.9	36
	1800	200	1.00	4	4.3	6.1	30
	1200	300	1.00	4	4.3	6.1	30
	1600	300	0.75	2	3.7	4.9	27
0.424	900	300	1.50	8	6.1	8.5	40
	1400	300	1.00	4	4.6	6.4	32
	1800	300	0.75	2	3.7	4.9	27
0.47	1500	200	1.50	8	6.4	8.8	40
	1000	300	1.50	8	6.4	8.8	40
	1800	250	1.00	4	4.6	6.4	33
0.564	1800	300	1.00	4	4.9	6.7	35

- 1) Data is for flush mounted ceiling diffusers.
- 2) Data is based on normal temperature differentials on cooling up to 11°C.
- 3) All NC ratings based on room absorption of 8dB, dampers fully open.  
Where no figure is given in the NC column the rating is <NC 20.

# MODEL EYE, CONTINUOUS LINE-SUPPLY

Air Volume m <sup>3</sup> /s/m	Diffuser Height mm	Pressure Drop N/m <sup>2</sup>	Neck Velocity m/s	Throw m		Sound Rating NC
				Min.	Max.	
.03	75	1	0.40	1.2	1.5	-
	100	1	0.30	0.9	1.2	-
.04	75	2	0.53	1.6	2.1	1.3
	100	1	0.40	1.2	1.6	-
.06	125	1	0.32	1.0	1.4	-
	75	4	0.80	2.4	3.1	16
.08	100	2	0.60	1.8	2.4	15
	125	1	0.48	1.6	2.1	-
.10	150	1	0.40	1.5	2.0	-
	75	5	1.06	3.2	4.1	20
	100	3	0.80	2.4	3.2	18
.12	125	2	0.64	2.2	2.9	17
	150	1	0.53	1.9	2.6	17
	75	8	1.33	4.0	5.1	24
.14	100	4	1.00	3.0	4.1	19
	125	3	0.80	2.7	3.6	18
	150	2	0.66	2.4	3.2	18
.16	75	11	1.60	4.7	6.1	26
	100	6	1.20	3.6	4.9	22
	125	4	0.96	3.2	4.3	19
	150	3	0.80	2.9	3.9	19
.18	200	2	0.60	2.3	3.2	18
	75	15	1.87	5.5	7.1	29
	100	8	1.40	4.2	5.7	25
	125	5	1.12	3.8	5.0	21
.20	150	3	0.93	3.4	4.5	20
	200	2	0.70	2.7	3.7	19
	75	19	2.13	6.3	8.2	33
	100	10	1.60	4.8	6.5	28
.22	125	7	1.28	4.3	5.7	25
	150	4	1.07	3.9	5.2	22
	200	3	0.80	3.1	4.2	20
	225	2	0.71	2.8	3.8	20
	100	12	1.80	5.4	7.3	31
.24	125	8	1.44	4.8	6.4	27
	150	6	1.20	4.4	5.8	25
	200	3	0.90	3.5	4.7	22
	225	2	0.80	3.2	4.3	21
	100	15	2.00	6.0	8.1	33
.26	125	10	1.60	5.4	7.2	29
	150	7	1.33	4.8	6.5	27
	200	4	1.00	3.8	5.3	23
	225	3	0.89	3.5	4.8	22
	100	15	2.00	6.0	8.1	33

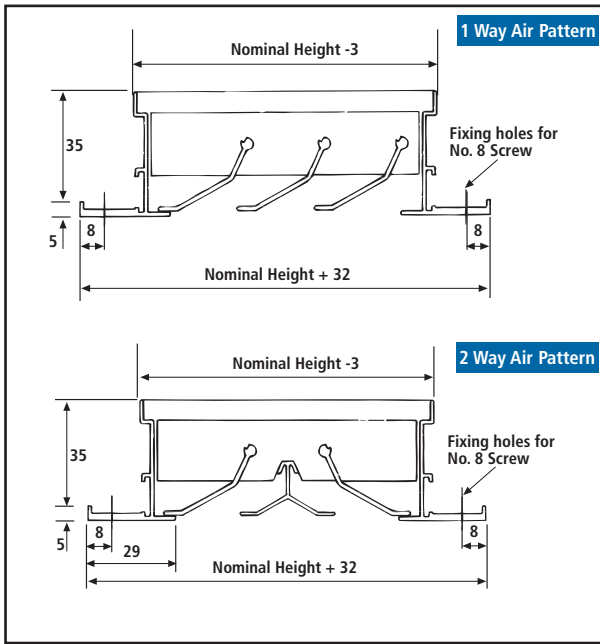
Air Volume m <sup>3</sup> /s/m	Diffuser Height mm	Pressure Drop N/m <sup>2</sup>	Neck Velocity m/s	Throw m		Sound Rating NC
				Min.	Max.	
.22	100	19	2.20	6.7	8.9	35
	125	12	1.76	5.9	7.9	31
	150	8	1.47	5.3	7.1	28
	200	5	1.10	4.2	5.8	24
.24	225	3	0.98	3.8	5.3	23
	100	22	2.40	7.3	9.8	37
	125	15	1.92	6.5	8.6	33
	150	10	1.60	5.8	7.7	30
.26	200	6	1.20	4.6	6.3	26
	225	4	1.07	4.2	5.8	24
	125	17	2.08	7.1	9.3	34
	150	11	1.73	6.3	7.4	31
.28	200	7	1.30	5.0	6.9	27
	225	5	1.16	4.5	6.3	25
	125	20	2.24	7.5	10.1	35
.30	150	13	1.87	6.8	9.0	33
	200	8	1.40	5.4	7.4	29
	225	5	1.24	4.9	6.8	27
.32	150	15	2.00	7.3	9.7	35
	200	9	1.50	5.7	7.9	30
.34	225	6	1.33	5.2	7.3	28
	150	17	2.13	7.7	10.3	37
.36	200	10	1.60	6.1	8.5	32
	225	7	1.42	5.6	7.8	30
.38	150	19	2.27	8.2	11.0	38
	200	11	1.70	6.5	9.0	33
.40	225	8	1.51	5.9	8.3	31
	200	12	1.80	6.9	9.5	34
.42	225	9	1.60	6.3	8.5	32
	200	14	1.90	7.3	10.1	35
.44	225	10	1.69	6.6	9.3	33
	200	16	2.00	7.6	10.5	36
.46	225	11	1.78	7.0	9.7	34
	200	19	2.25	8.6	11.9	39
.48	225	14	2.00	7.8	11.0	36
	225	17	2.22	8.7	12.2	39

## MODEL EYE OUTLET AREAS - m<sup>2</sup>

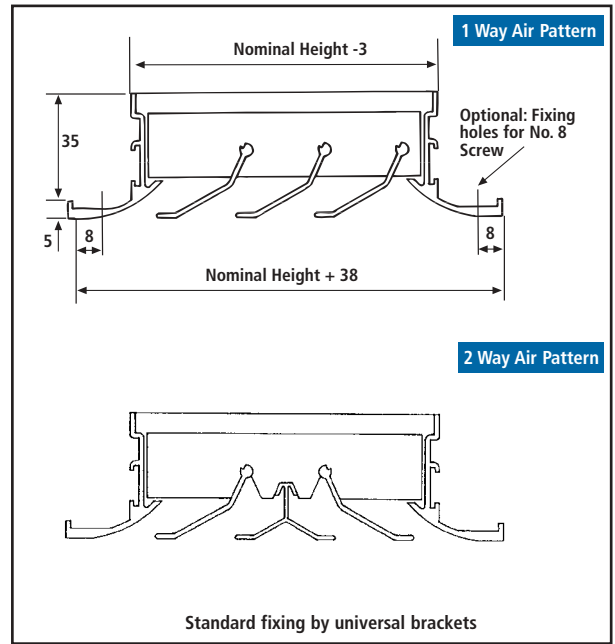
Diffuser width mm	Diffuser height mm				
	100	150	200	250	300
100	.002	-	-	-	-
150	.004	.007	-	-	-
200	.006	.009	.013	-	-
250	.007	.012	.016	.021	-
300	.009	.014	.020	.025	.031
350	.010	.017	.023	.030	.036
400	.012	.019	.027	.034	.042
450	.013	.022	.030	.039	.048
500	.015	.024	.034	.043	.053
550	.016	.027	.037	.048	.058
600	.018	.029	.041	.053	.064
650	.019	.032	.045	.057	.070

Diffuser width mm	Diffuser height mm				
	100	150	200	250	300
700	.021	.035	.048	.062	.075
750	.023	.037	.052	.066	.081
800	.024	.040	.055	.071	.086
850	.026	.042	.059	.075	.092
900	.027	.045	.062	.080	.097
950	.029	.047	.066	.084	.103
1000	.030	.050	.069	.089	.109
1050	.032	.052	.073	.094	.114
1100	.033	.055	.076	.098	.120
1150	.035	.058	.080	.103	.125
1200	.037	.060	.084	.107	.131

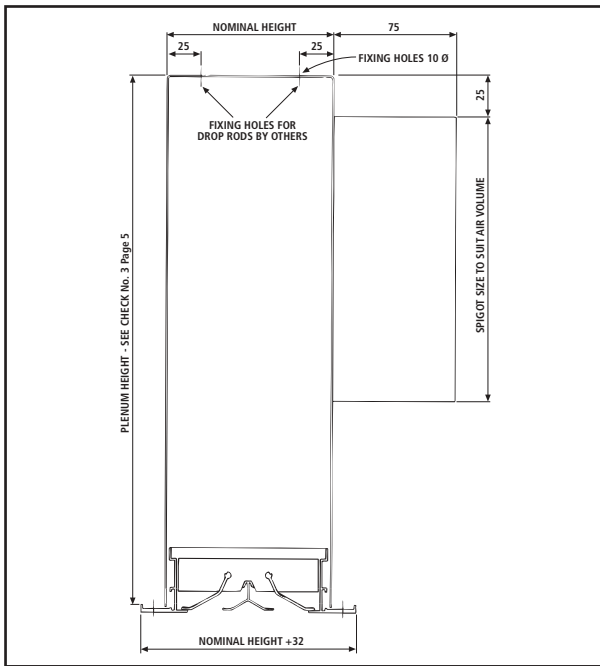
### Model EKE 1 and 2 Way Diffusers



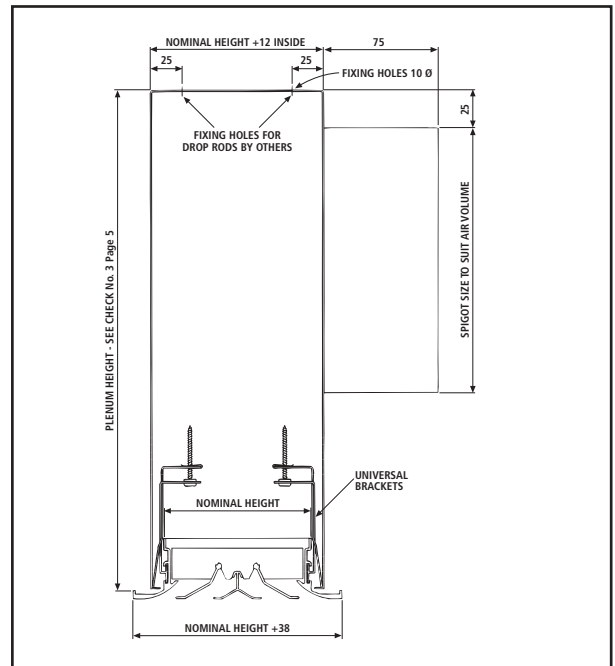
### Model EYE 1 and 2 Way Diffusers



### Model EKE 2 Way Diffuser with ENO Plenum



### Model EYE 2 Way Diffuser with ENU Plenum



### Weights

Grille Heights	75	100	125	150	175	200	225	250	275	300
Kg/m	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0



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