

DS – Step Mounted Displacement Diffuser

Model: DS

The Holyoake DS Series of supply diffusers operate on the principles of Displacement Ventilation.

Displacement Ventilation is essentially a buoyancy driven displacement process, where supply air at a temperature slightly cooler than the design room air temperature, is delivered into the room at low level. The cool air spreads across the floor only rising when it comes into contact with a heat source such as a human. The heated air rises and will exit the room via openings at ceiling level, taking with it any pollutants that have been picked up on the way.

Holyoake DS Displacement Diffusers have been designed to enable step mounting, although they can also be used in many other locations. They are ideally suited for use in Auditoria and Theatres. Typically these areas contain a large volume of space that although not occupied is still conditioned. By introducing the treated air unobtrusively from directly behind the occupants, only the space around the patrons is conditioned, rather than the whole auditorium. This ensures that the occupied area is maintained at ideal conditions, whilst saving energy treating the whole space at design parameters.

Features

- Unobtrusive Step Mounting.
- Energy Saving Operation.
- No Drafts.
- Low Noise.
- Easy Installation.
- Decorative Fascia.

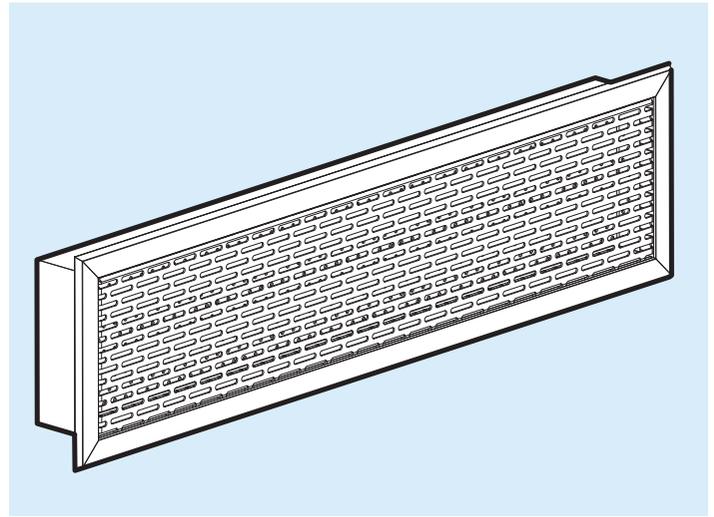
Performance

The DS displacement diffuser supplies a low velocity, low momentum, blanket of air into the occupied space. Low velocities ensure that no drafts are felt by the occupants. Plenum pressures of around 15-20 Pa will achieve excellent balancing across all diffusers, while achieving low noise and throw lengths.

Performance Notes

1. ΔP_s – Static Pressure inside the supply plenum.
2. Throw lengths are based on a velocity of 0.25m/s.
3. Exit Velocity is the supply air velocity on leaving the diffuser face.
4. A_n – is the area of the exact neck of the diffuser.
5. Acoustic data assumes a standard room absorption of 10dB, Re 10^{-12} watts.
6. All testing was performed with the diffuser mounted in a plenum box.

Guide Weights 25mm Flange	
Nominal Size	Approximate Weight in Kg.
250 x 150	1.08
400 x 300	3.50
600 x 200	2.21
200 x 600	2.21
800 x 150	3.46
1000 x 120	4.33



Surround and Fixing Systems

The design of the grille ensures that any number of simple installation methods can be used. The Holyoake RC frame system is compatible with the 25 mm wide flange which, allows for the easy removal of the grille for cleaning, or maintenance purposes. The RC frame also allows the grille to be installed once all other trades are finished, ensuring the grille is kept in perfect condition. **Note: RC frame is not available with the 17 mm wide flange.** Alternatively, the grille can be sprung, or face fixed through the flange provided.

Two flanges are available:

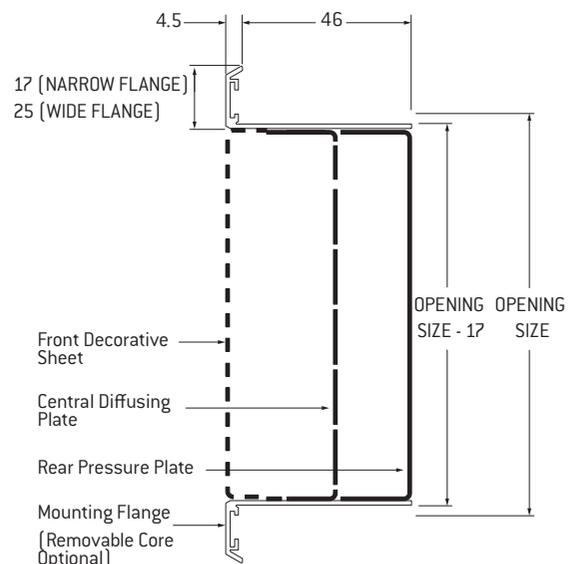
Narrow Flange – 17mm wide. Style No. 5 on page 51B

Wide Flange – 25mm wide. Uses DDL20 surround as page 204E.

System Balancing

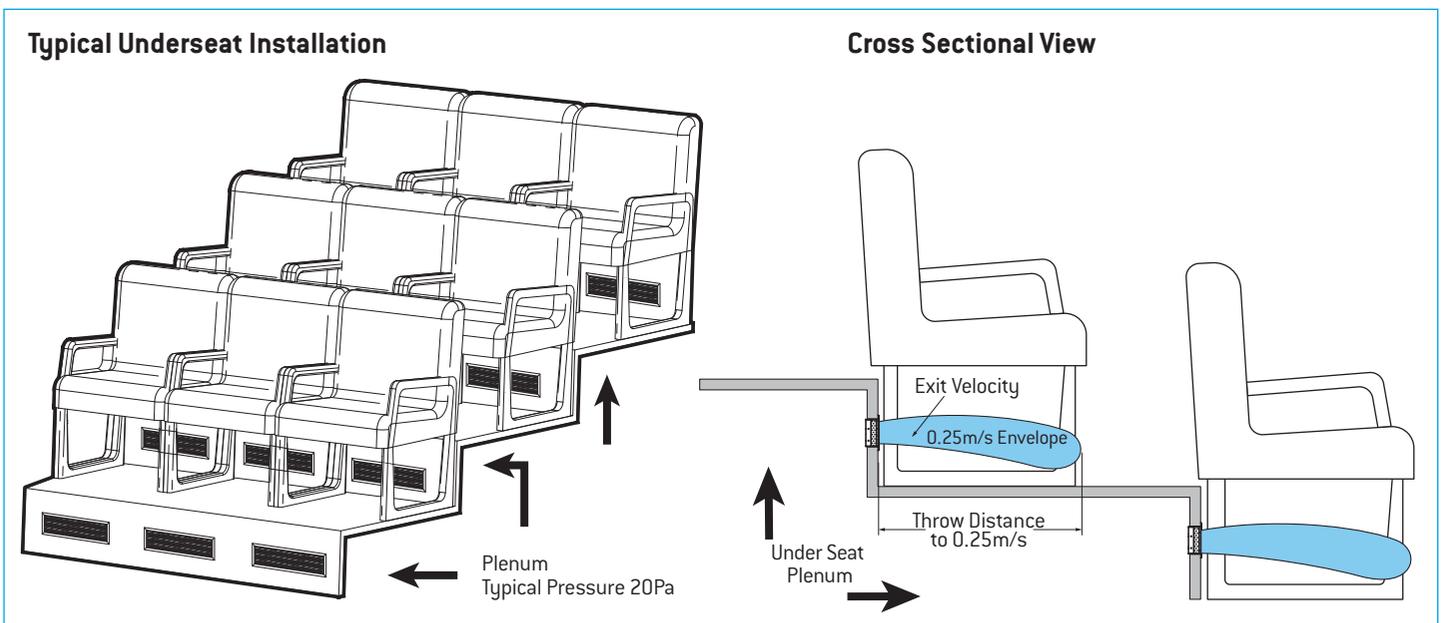
The DS Displacement Diffuser achieves the unobtrusive delivery of conditioned air, whilst still maintaining a significant pressure drop across the grille. This allows the diffuser to be used in plenum fed distribution systems without balancing dampers. In theatres and auditoria the area under the seating can be used as the supply plenum.

Cross Section through DS Displacement Diffuser



Size	Flowrate [l/s]	5.0	7.5	10.0	12.5	15.0	20.0	25.0	30.0	35.0	40.0	45.0
400x120 300x160 200x240 $A_n=0.039$	ΔP_s (Pa)	4	6	10	14	19						
	Throw mm	150	200	350	450	800						
	Exit Vel (m/s)	0.29	0.31	0.35	0.42	0.50						
	NC	-	15	17	19	20						
500x120 400x150 300x200 200x300 $A_n=0.05$	ΔP_s (Pa)		5	9	12	17	27					
	Throw mm		-	300	350	400	900					
	Exit Vel (m/s)		0.22	0.30	0.34	0.38	0.50					
	NC		13	14	15	17	19					
600x120 400x180 300x240 200x360 $A_n=0.06$	ΔP_s (Pa)			5	7	9	15	22				
	Throw mm			150	300	450	750	900				
	Exit Vel (m/s)			0.29	0.35	0.40	0.45	0.50				
	NC			-	14	16	19	20				
700x120 600x140 400x210 300x280 200x420 $A_n=0.07$	ΔP_s (Pa)				6	9	14	20	29			
	Throw mm				-	-	500	750	1000			
	Exit Vel (m/s)				0.20	0.25	0.35	0.42	0.50			
	NC				14	16	18	20	23			
800x120 600x160 400x240 300x320 200x480 $A_n=0.081$	ΔP_s (Pa)					6.5	11	16	23	30		
	Throw mm					-	250	450	750	1000		
	Exit Vel (m/s)					0.25	0.30	0.37	0.45	0.50		
	NC					14	17	20	22	25		
900x120 600x180 400x270 300x360 200x540 $A_n=0.091$	ΔP_s (Pa)						9	13	18.5	24	31	
	Throw mm						200	300	600	900	1300	
	Exit Vel (m/s)						0.30	0.35	0.45	0.50	0.58	
	NC						17	19	22	24	26	
1000x120 800x150 600x200 400x300 200x600 $A_n=0.101$	ΔP_s (Pa)						7	10	15	19	25	31
	Throw mm						150	250	500	650	900	1050
	Exit Vel (m/s)						0.30	0.33	0.40	0.45	0.50	0.58
	NC						16	18	21	23	25	26

*See Performance Data Notes on Page 100D.



BHC, DFR, DS & JD

Product Ordering Key and Suggested Specifications

BHC	–	SIZE	–	OPTIONS	–	FINISH
High Capacity Barrel Diffuser		635 x 300 or 1270 x 300		24 V AC or, 230 V AC Actuators / Thermal Power Pill		Mill Aluminium Anodized Aluminium Holyoake White Powder Coat

High Capacity Barrel Diffusers shall be Holyoake Series BHC. They shall be designed to be mounted into a supply plenum that may contain a number of BHC units, which will provide high capacity and long throw diffusion. Adjustment is available to change the vertical and horizontal throw and spread.

Series BHC shall be finished in Mill Aluminium and fitted with accessories where indicated.

All shall be as manufactured by Holyoake.

DFR	–	FINISH
Displacement Floor Mounted Round Diffuser		Black Holyoake White Powder Coat

Displacement Floor Mounted Round Diffusers shall be Holyoake Series DFR. They shall be designed to mount into a supply plenum at floor level and to provide an even distribution of air flow at low velocity, thereby creating a draft-less environment. Pressure drop through the displacement diffusers will be such to provide balance within the supply plenum, while being low enough to generate very low noise levels.

Series DFR Displacement Diffusers shall be circular.

All shall be as manufactured by Holyoake.

DS	–	W x H	–	FLANGE	–	OPTION	–	FINISH
Displacement Step Mounted Diffuser		Hole Size		17mm 25mm		RC Removable Core (25 mm flange only).		Powder Coat Mill Aluminium

Displacement Step Mounted Diffusers shall be Holyoake Series DS. They shall be designed to mount into a supply plenum at floor level and to provide an even distribution of air flow at low velocity, thereby creating a draft-less environment. Pressure drop through the displacement diffusers will be such to provide balance within the supply plenum, while being low enough to generate very low noise levels.

Series DS Displacement Step Mounted Diffusers are designed to be face fixed, or supplied with the Holyoake Removable Core System (25 mm flange only).

All shall be as manufactured by Holyoake.

JD	–	250	–	OPTIONS	–	FINISH
Jet Diffusers		Nominal Size		Mounting Plate (Type 1, 2, 3 or 4)		Holyoake White Mill Aluminium Powder Coat

Circular Jet Diffusers shall be Holyoake Model JD constructed from spun aluminium cones. JD Jet Diffusers shall be capable of operating in either diffused, or jet air pattern configurations. The air patterns shall be achieved by rotating the cone assembly through 180 degrees. JD Jet Diffusers shall be complete with a mounting system suitable for wall, or ceiling applications.

Series JD shall be finished in powder coat and fitted with accessories where indicated.

All shall be as manufactured by Holyoake.

Note

For ceiling applications of JD Diffusers, Seismic Restraints would be required, but not supplied.

JND, EL, EL-P, FSD & TLC-EL

Product Ordering Key and Suggested Specifications

JND	-	SIZE	-	FINISH	<p>Holyoake Jet nozzle diffusers shall be of spun aluminium construction with a steel concealed mounting system. They shall be designed to supply large air quantities over large throws.</p> <p>Series JND shall be finished in powder coat and all shall be as manufactured by Holyoake.</p>
Jet Nozzle Diffuser		160, 200, 250, 360, 400		Powder coat white, special colours available on request	

FSD	OPTIONS	<p>Circular floor diffusers shall be Holyoake FSD Series manufactured in glass filled polycarbonate, in self-coloured grey, or black, as standard. Nominal FSD diffuser size shall be 220mm in diameter. The FSD diffuser shall contain a flow regulation damper and the fascia is complete with 'Min/Max' indication.</p> <p>Series FSD mounting clamp and trim ring shall also be manufactured in glass filled polycarbonate. FSD diffusers shall contain a dust/dirt collection basket.</p> <p>All Series FSD materials used are fire retardant and the diffusers shall resist permanent deformation when subject to point loads up to 500 Kg.</p> <p>All shall be as manufactured by Holyoake.</p>
Floor Swirl Diffuser	Die Cast Aluminium Mill Finish, or, Die Cast Aluminium Powder Coat Finish	

EL	-	2	-	S	-	300 x 300	-	ACCESSORIES	-	OPTIONS	-	FINISH	<p>Surface Mounted Eyelash Type</p> <p>EL surface mounted diffusers shall be of the "Eyelash", or curved blade type. They shall be of extruded aluminium construction, with each blade individually adjustable from the face. Optional opposed blade damper can be adjusted through the face of the diffuser.</p> <p>All shall be as manufactured by Holyoake</p>
Series "Eyelash"		Core Model		Style		Duct Size		OBD-1 Opposed Blade damper		RC 25 RC 50 CMF Removable Core Frame Option		Holyoake White Mill Aluminium Powder Coat	

EL	-	P	-	2	-	S	-	300 x 150 - 600 x 600	-	ACCESSORIES	-	FINISH	<p>Panel Lay-in Eyelash Type</p> <p>EL-P Panel Lay-in diffusers shall be of the "Eyelash", or curved blade type. They shall be of extruded aluminium construction, with each blade individually adjustable from the face. Optional opposed blade damper can be adjusted through the face of the diffuser.</p> <p>All shall be as manufactured by Holyoake.</p>	
Series "Eyelash"		Panel Lay-in Model		Core Model		Style		Duct Size		Module Size		OBD-1 Opposed Blade damper		Holyoake White Mill Aluminium Powder Coat

TLC-EL	-	2	-	L	-	400 x 150	-	ACCESSORIES	-	FINISH	<p>Curved Frame Eyelash Type</p> <p>TLC-EL diffusers shall be of the "Curved Frame Eyelash" type, with curved blades. They shall be of extruded aluminium construction, with each blade adjustable from the face. Optional opposed blade damper can be adjusted through the face of the diffuser.</p> <p>All shall be as manufactured by Holyoake.</p>
Series Curved Frame "Eyelash"		Core Model		Style		Nominal Duct Size		OBD-1 Opposed Blade damper		Holyoake White Mill Aluminium Powder Coat	

Note

For ceiling applications of EL Diffusers, Seismic Restraints would be required, but not supplied.