EFFECTIV HVAC™

ARCHITECTURE
COMFORT
ENERGY EFFICIENCY

Thermal Comfort and Energy Efficiency

HVAC system is a chain of components as strong as its weakest link

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Diffusers = small portion of total cost, yet big impact on performance

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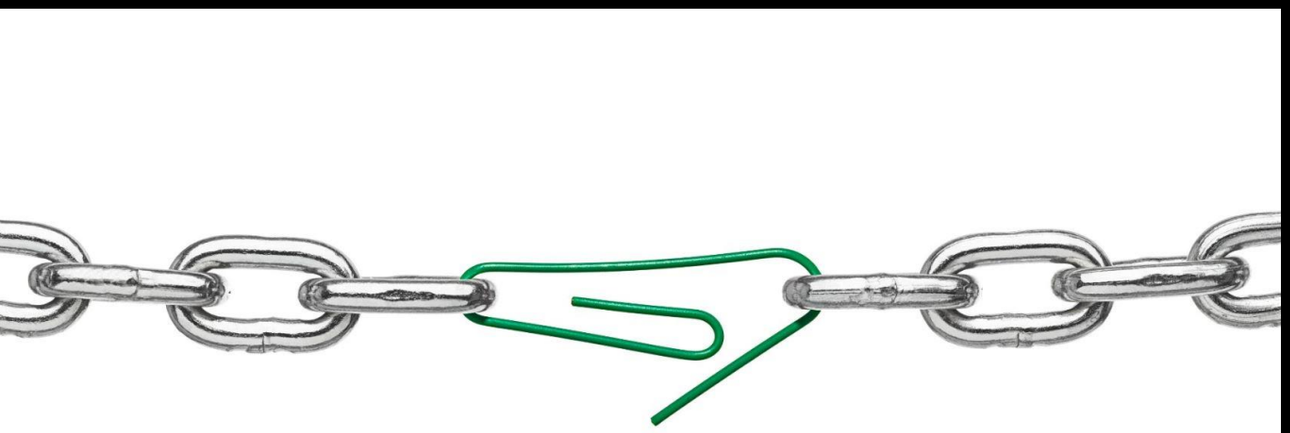
Thermal discomfort and loss of efficiency cost a lot in the long run



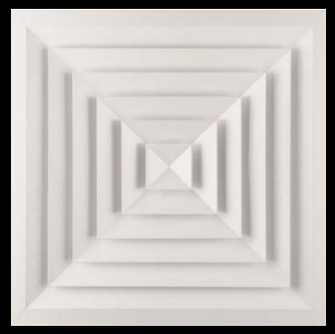
Diffusers are often the weakest link!

EFFECTIV HVAC™

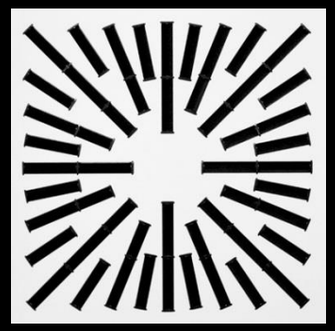
High Induction Diffusers

High Induction Ratio
=
More room air induced and mixed with the same amount of supplied air
AND faster decrease of Delta T

Example: 500 cfm, Delta T = 15°F



500 cfm = 7 ft throw (40 fpm)
Induction Ratio i at 7’ = 1
Room air mixed = 500 x 1 = **500 cfm**
Delta T @ distance 7’ = **4.5**°F



500 cfm = 14 ft throw (40 fpm)
Induction Ratio i at 14’ = 26
Room air mixed = 500 x 26 = **13,000 cfm**
Delta T @ distance 7’ = **1.05**°F

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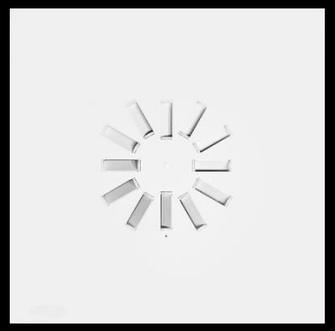
HVAC
™

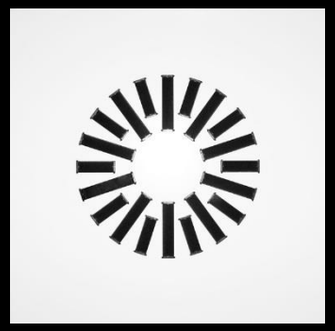
High Induction Diffusers

Square or round, multiple models for optimal performance
between 50 cfm and 550 cfm



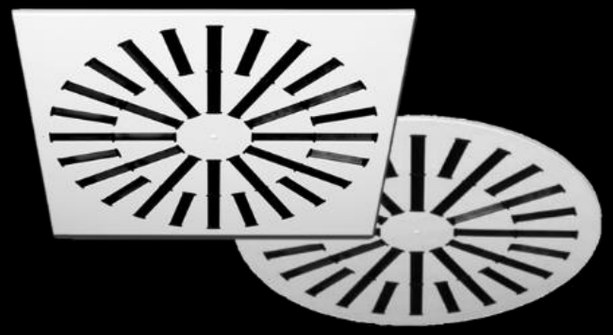
AXO-S300

50 - 160 cfm



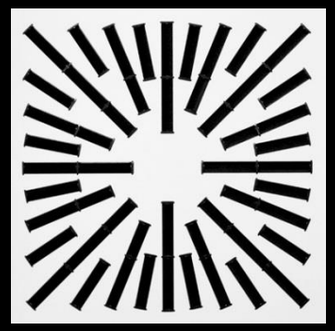
AXO-S400

100 - 250 cfm



AXO-S

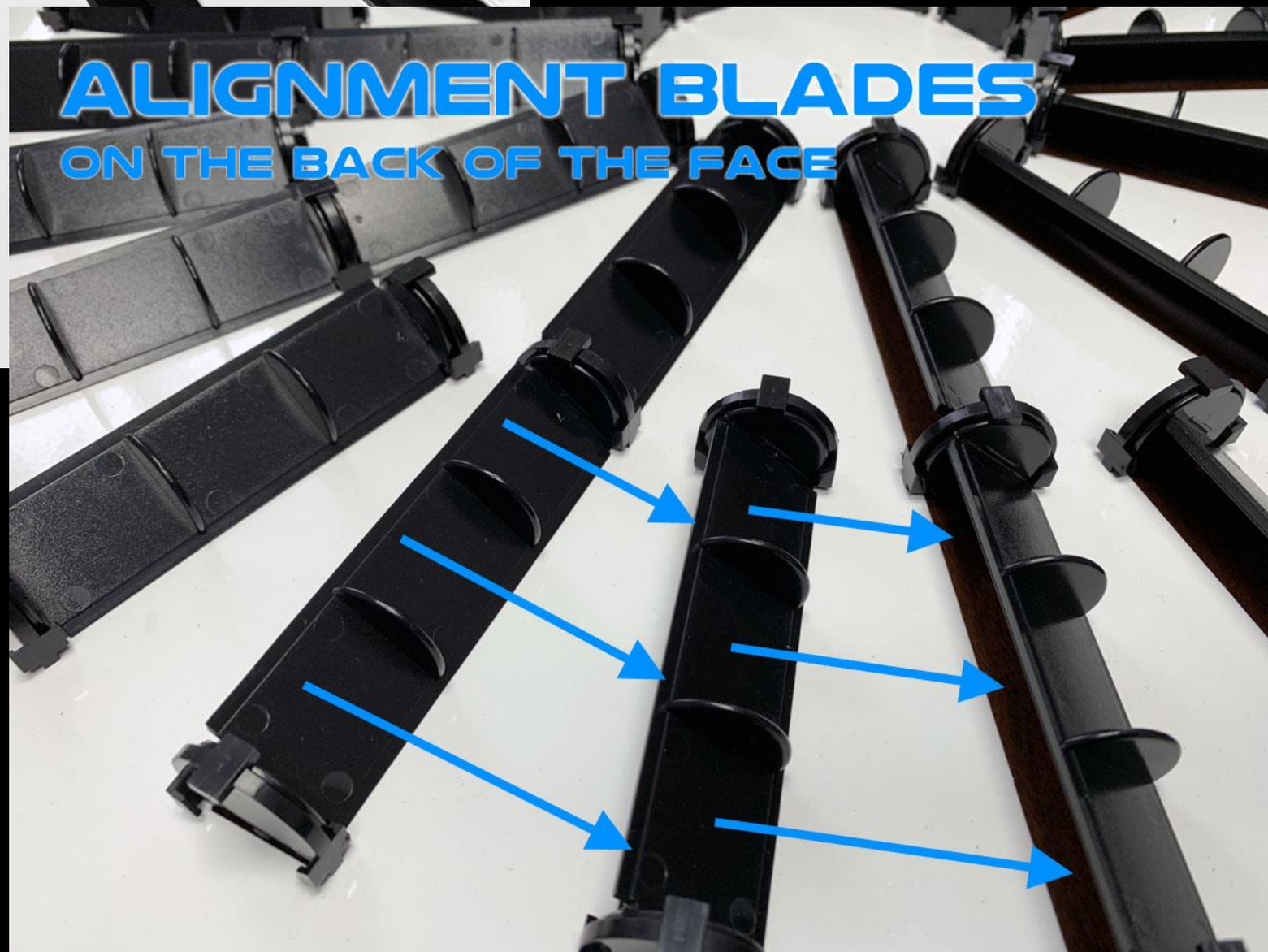
230 – 500 cfm



AXO-SX

300 – 550 cfm


SMOOTH VANES ON FACE SIDE
SLEEK LOOK AND MUCH EASIER TO CLEAN

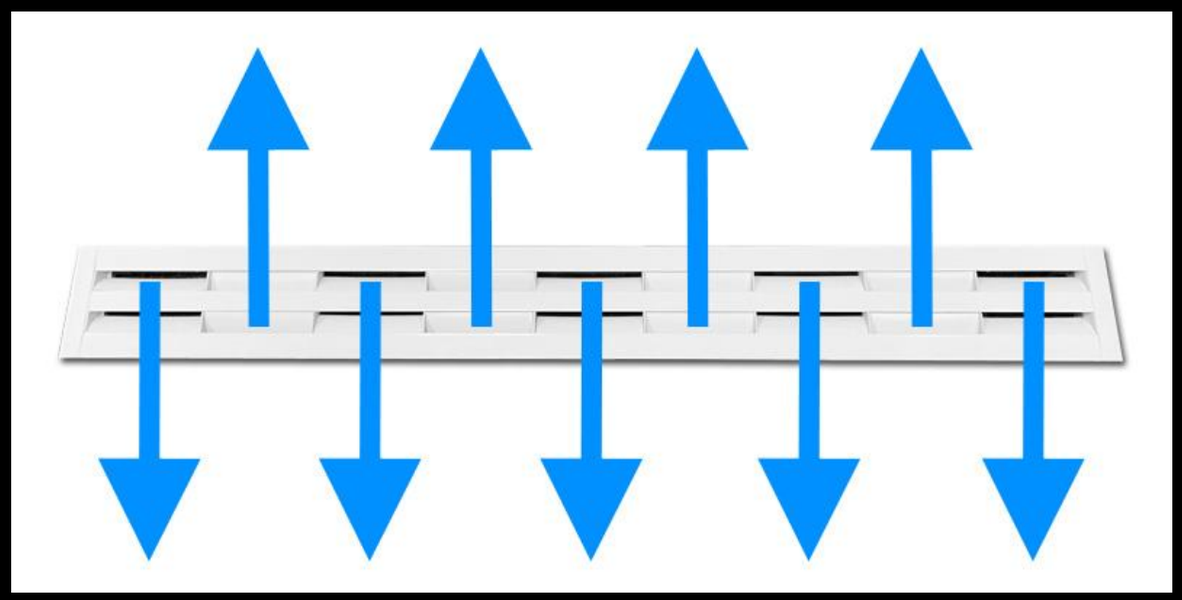

ALIGNMENT BLADES
ON THE BACK OF THE FACE

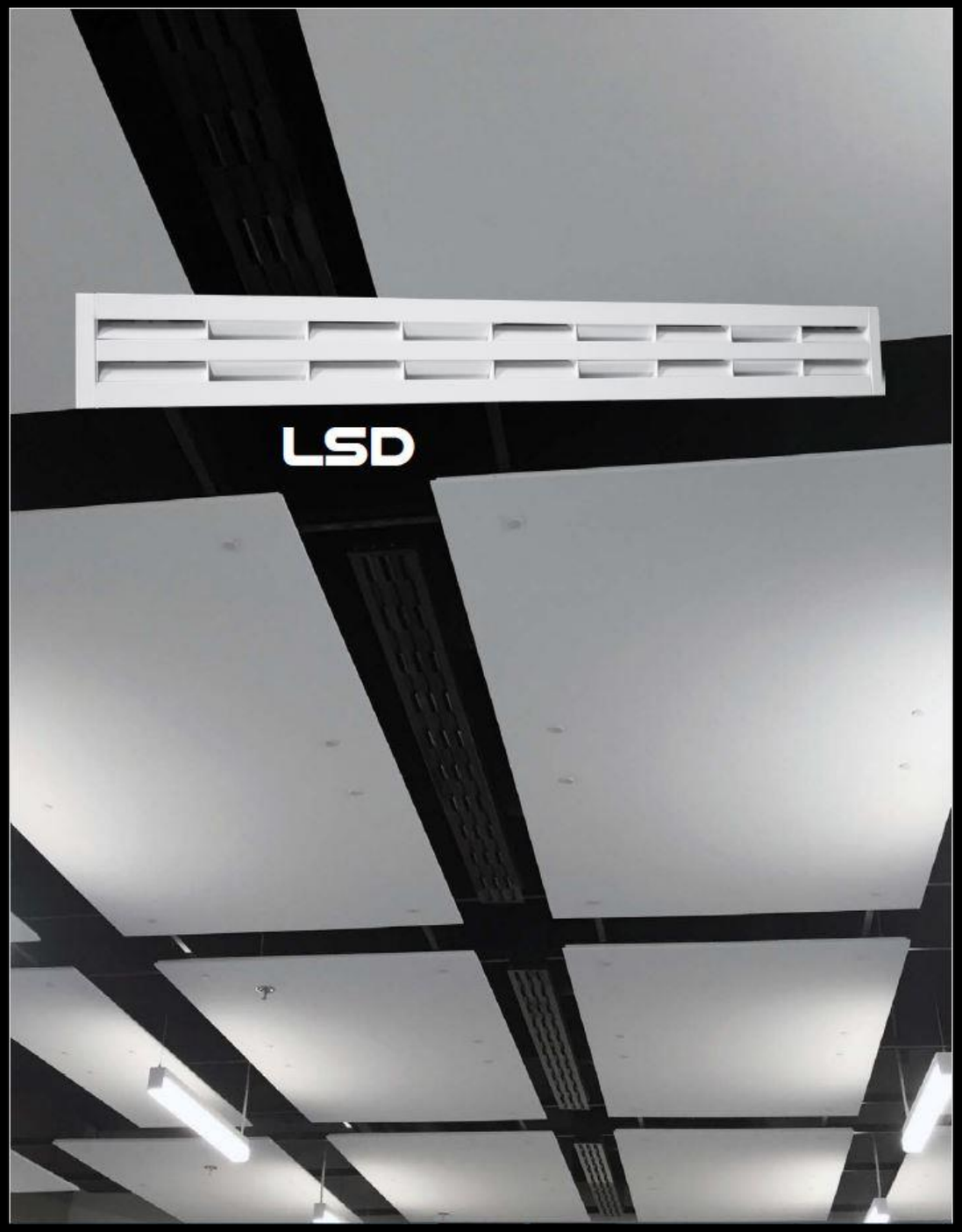
High Induction Linear Slot Diffusers

Induce more room air by separating air jets

60% - 100% more induction than standard linears

Can also diffuse 2 way pattern from 1 slot





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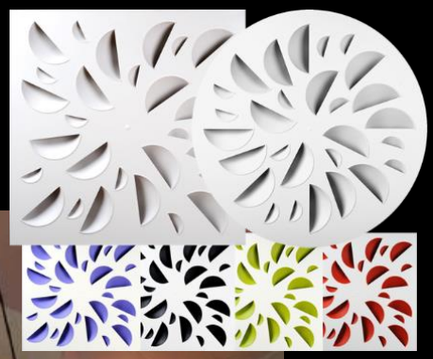
Architectural Swirl Diffusers



Combine high performance with aesthetic appeal!

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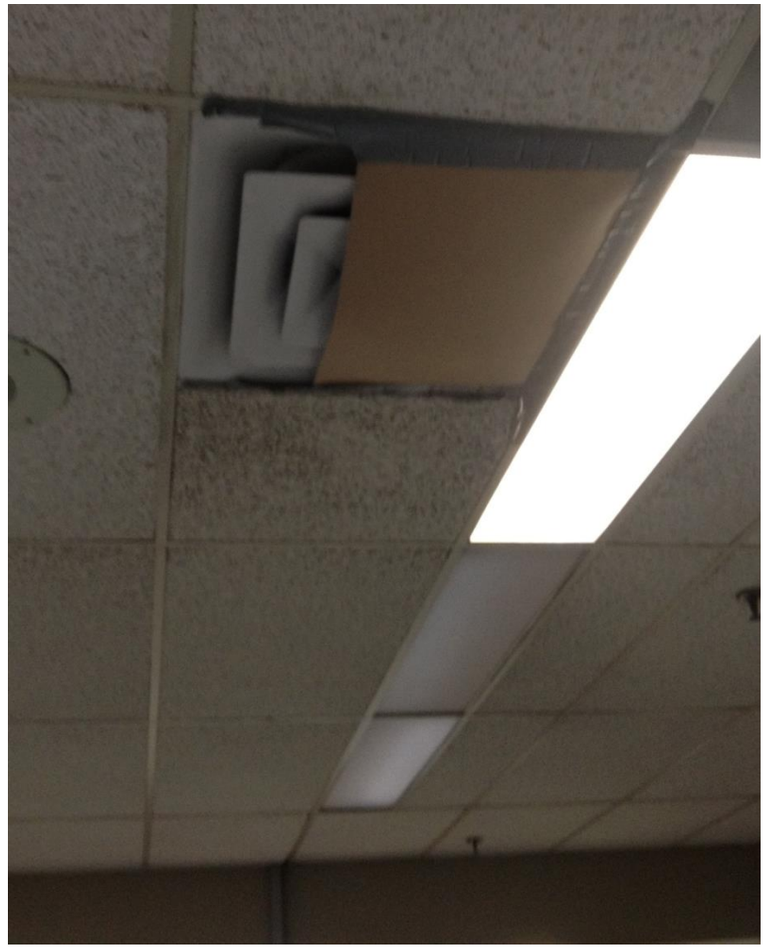
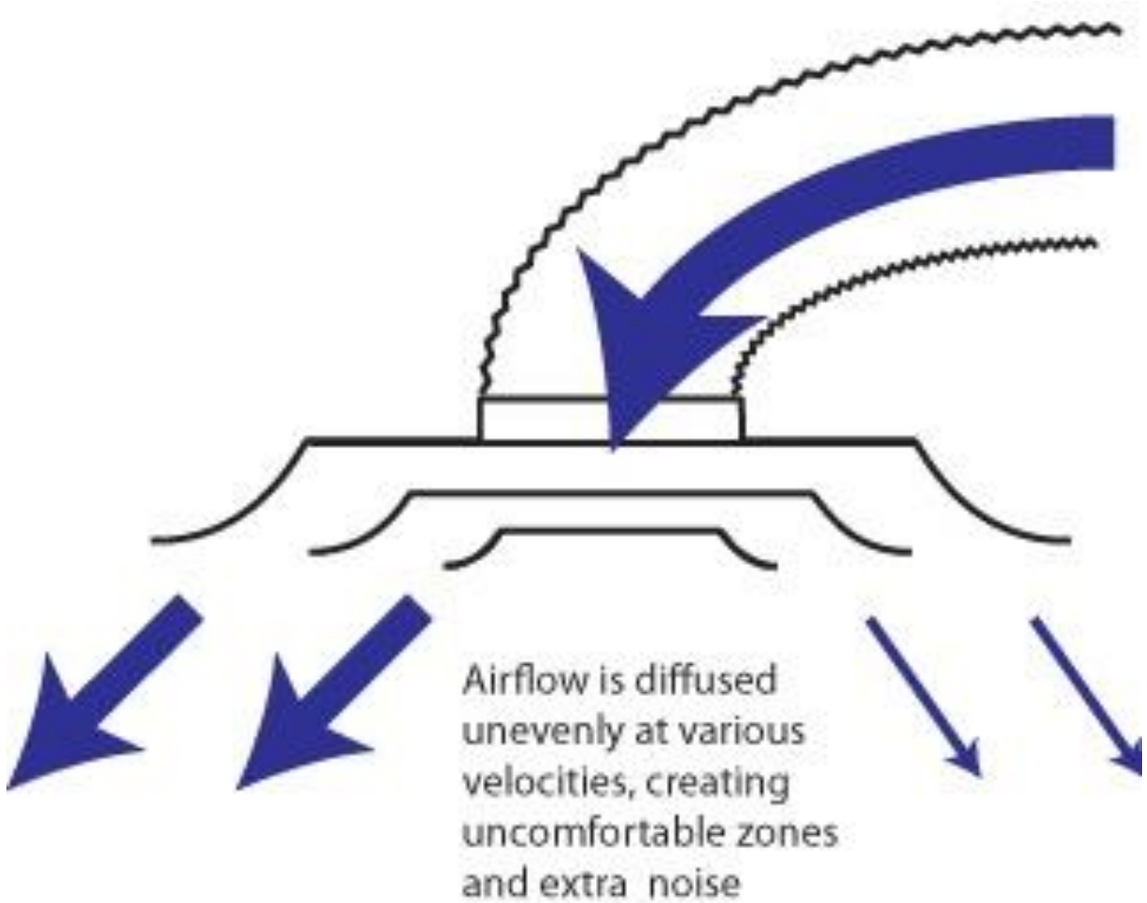
- Two opening sizes creating mixed velocity jets
- High induction ratio, mixes more room air with same amount of supplied air
- Faster reduction of Delta T
- Higher tolerance to VAV and temperature variations

The most common source of air distribution complaints





Flex duct with kink or angle

Most of the airflow is diffused in one direction

Higher velocity increase noise and create discomfort

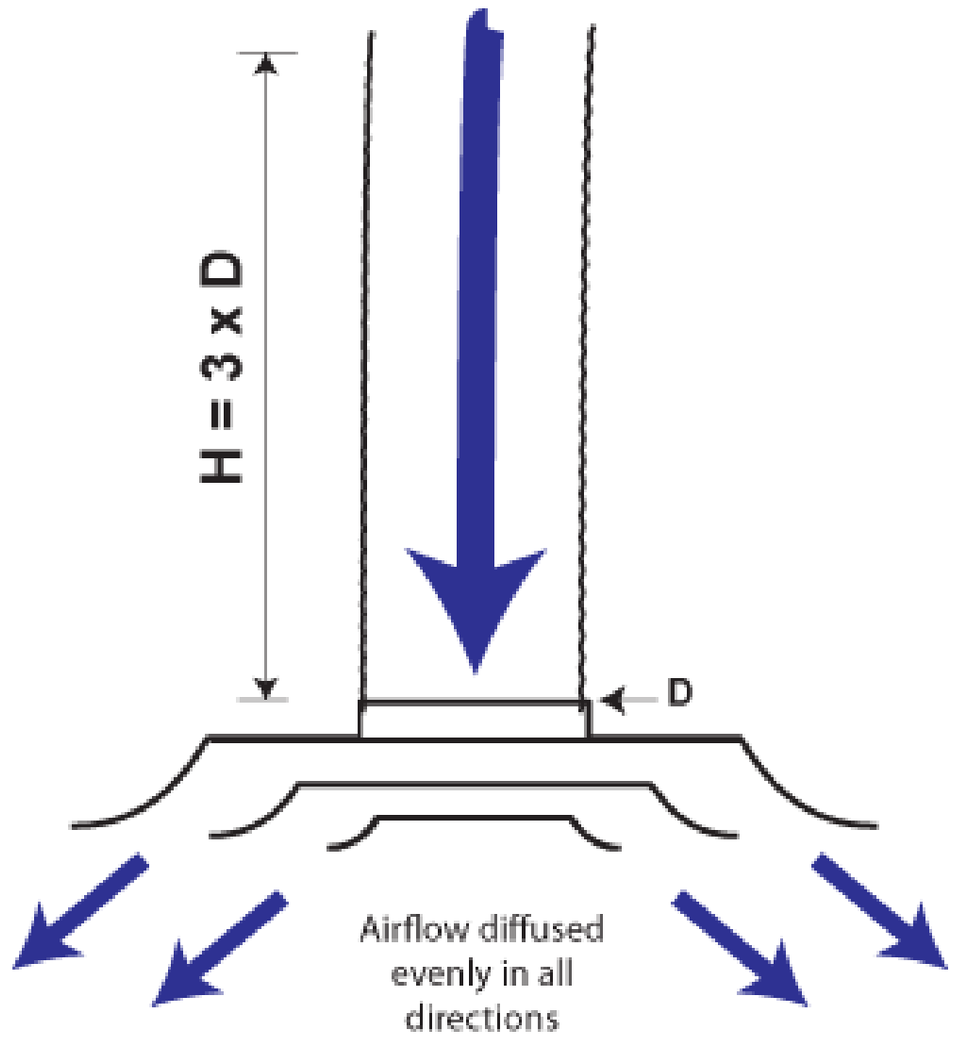
ASHRAE Standard 70-2006

Method of Testing the Performance of Air Outlets and Air Inlets

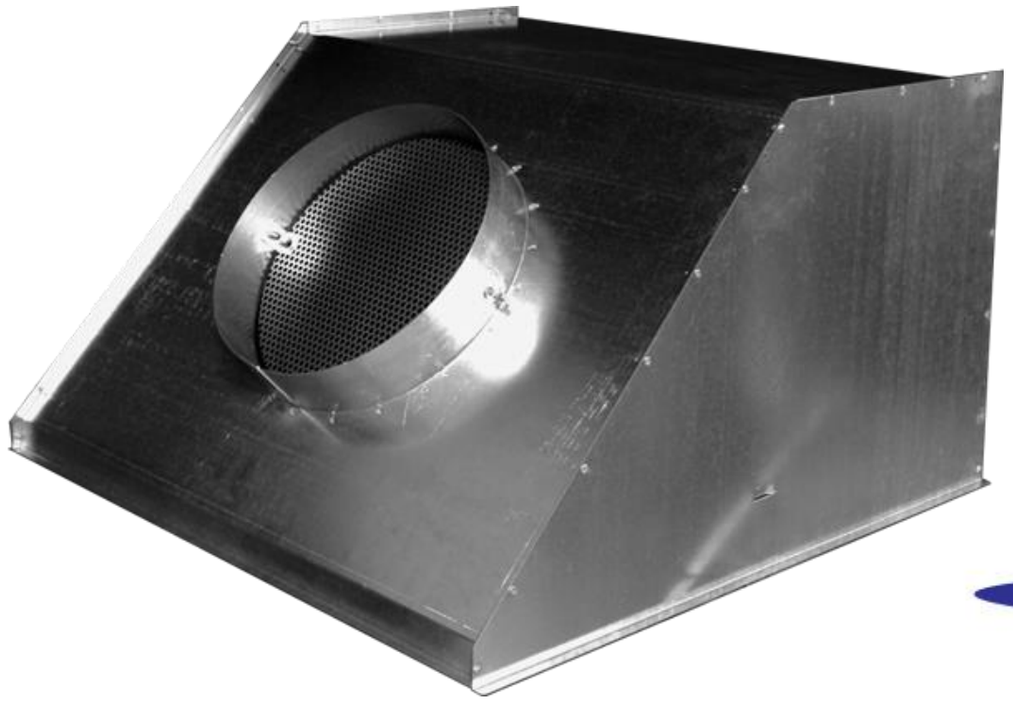
Rarely happens in the real world

Most of the time, not enough space in the ceiling

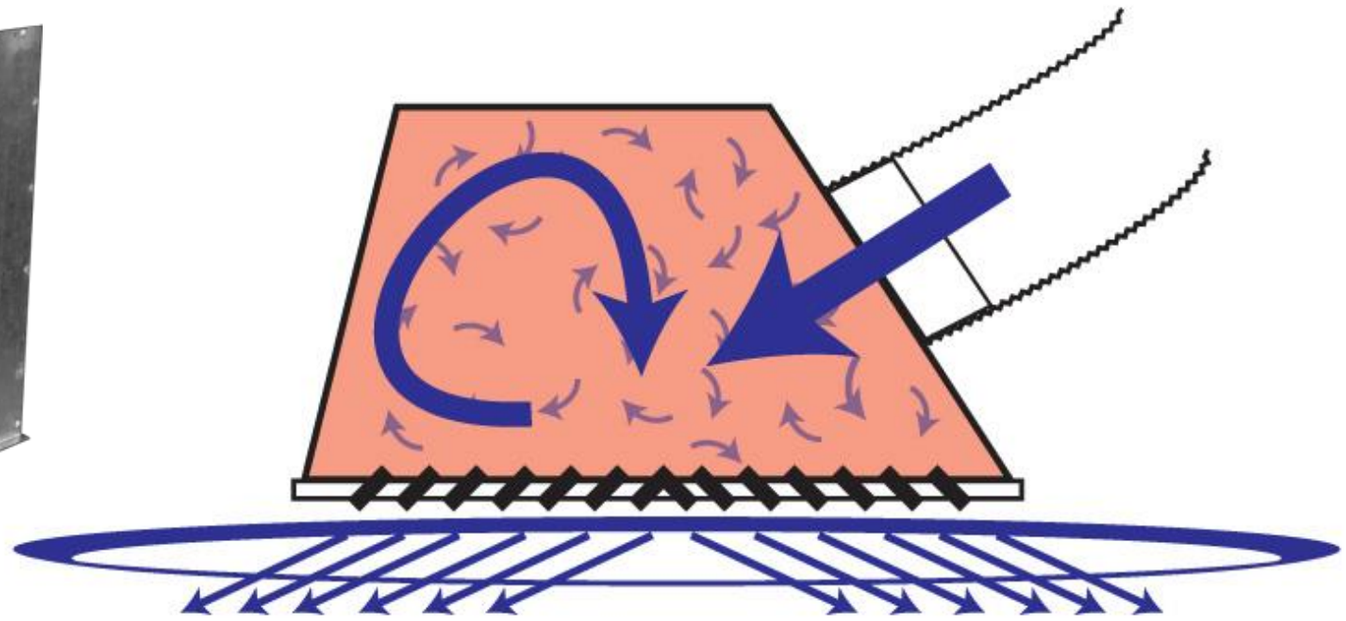
This is the data you are using in your designs!



PERFAIR-SS + Swirl Diffusers



Swirl Diffuser with Restricted Free Area
Pressurized Plenum With Side Connection



Reliable air distribution despite duct angles or kinks

Required ceiling space: only 14”

Available with acoustical insulation & cable-operated dampers

Comparing standard ceiling diffusers with
High Induction Swirl Diffusers

Does the angle of air entering the diffuser impact the airflow?

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AXO & NEX are great for Restaurants, Stores, Hotels, Hospitals, Dental Clinics, Meeting Rooms, ...

What About Office Buildings and Schools?

PLAY Adjustable Sectors

The only diffuser allowing for full 360° horizontal adjustment of airflow

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Easy to adjust, from the face and without tools

1, 2, 3, 4 way and swirl with easy sectors positioning

PLAY

Adjustable Sectors Diffusers

The ultimate toys for Architects and Engineers, PLAY diffusers combine innovative look and versatile performance. Providing for both attractive designs and increased level of comfort. PLAY diffusers are the only diffusers allowing for full and easy horizontal adjustment of the airflow, from the face and without tools.

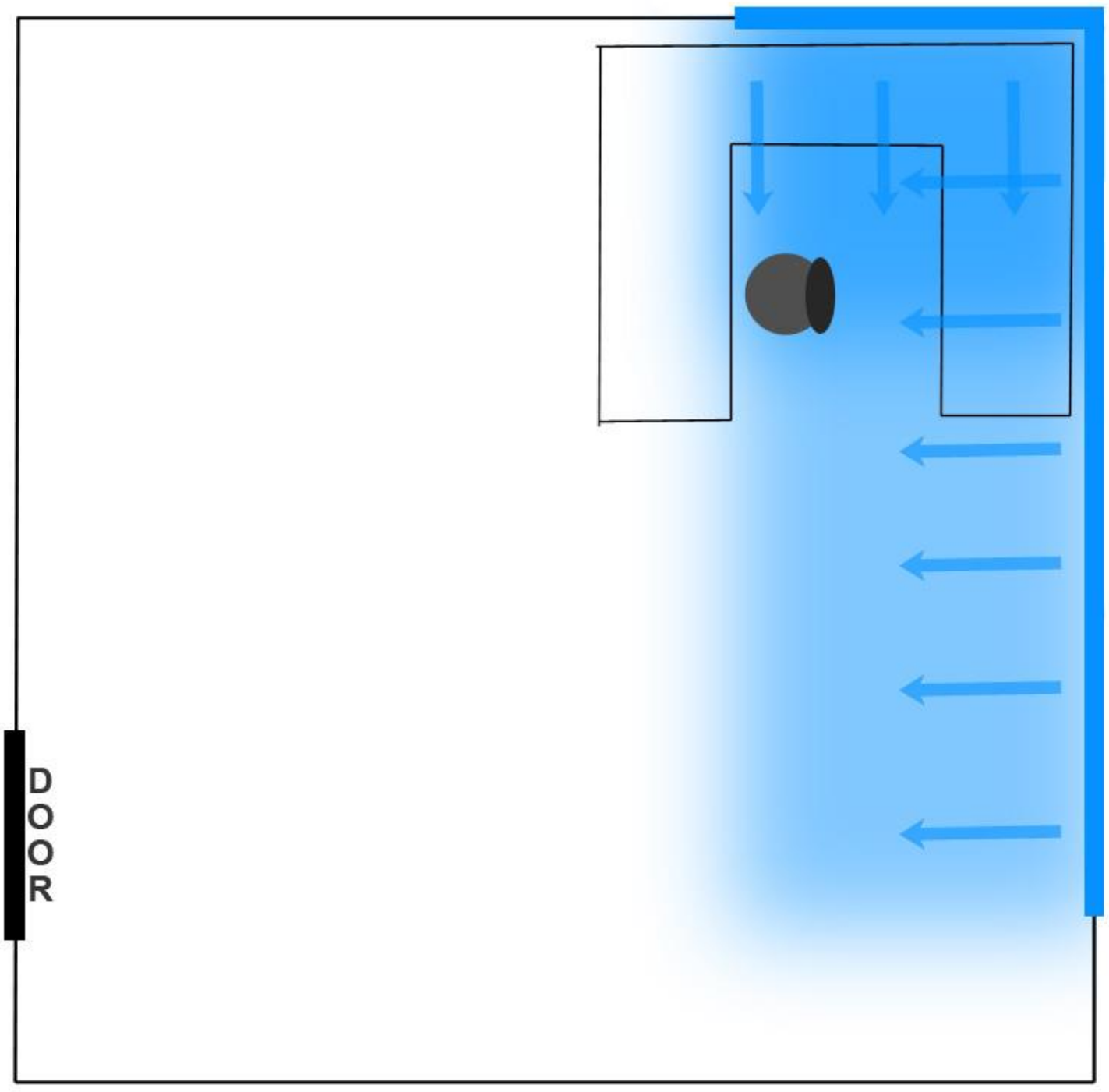
PLAY WITH IT! Full adjustability allows for multiple air patterns

4 Way | 3 Way | 2 Way | 1 Way | Swirl

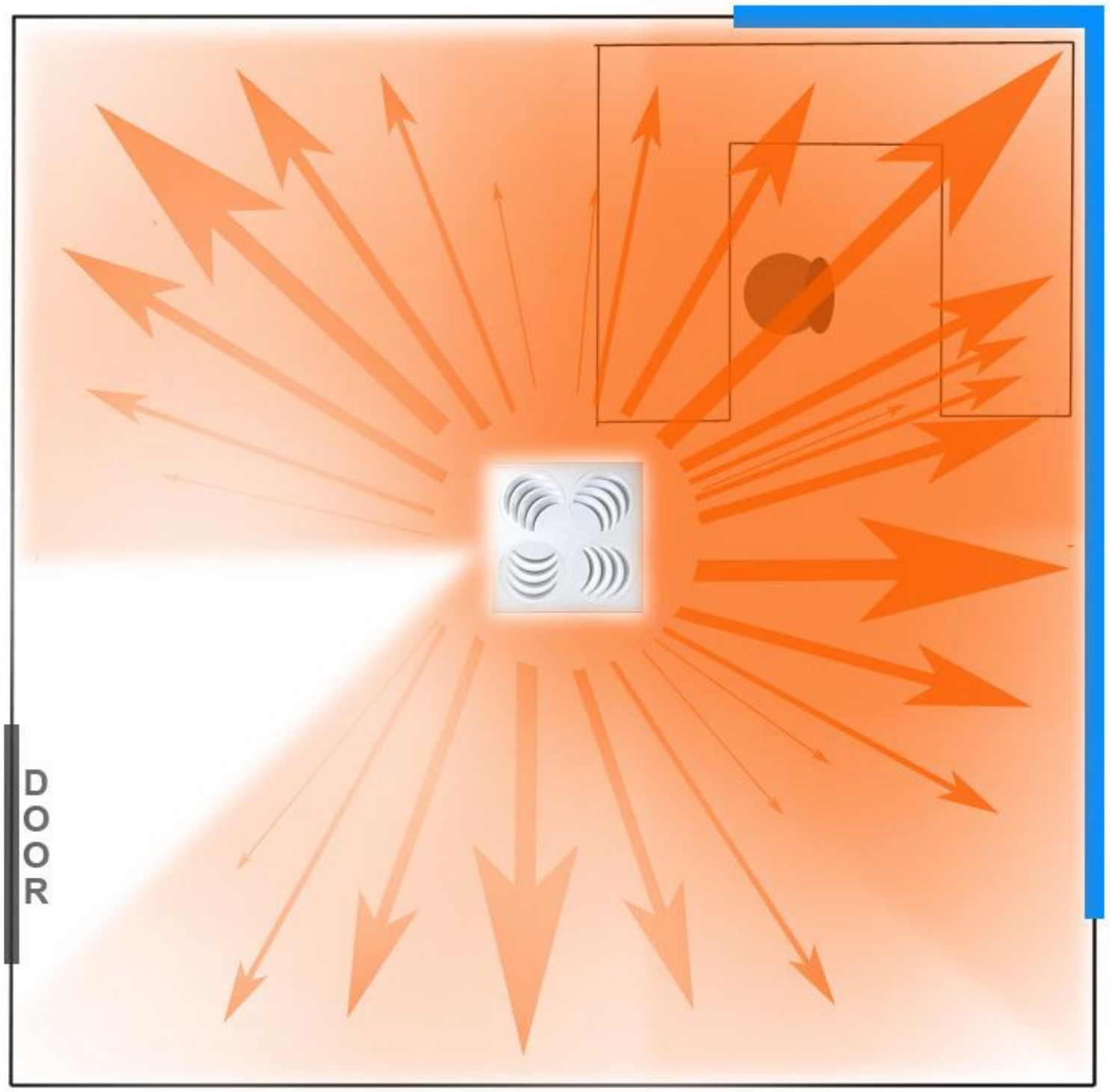
Available in square, rectangular or circular shapes, PLAY diffusers are suitable for suspended ceiling, drywall and open ceiling applications

Innovative Solutions by EFFECTIV HVAC™

Single Office Example



Thanks to the PLAY we could...



Solve the comfort issue

in the most energy efficient

and cost-effective way

PLAY-R

New Design Possibilities

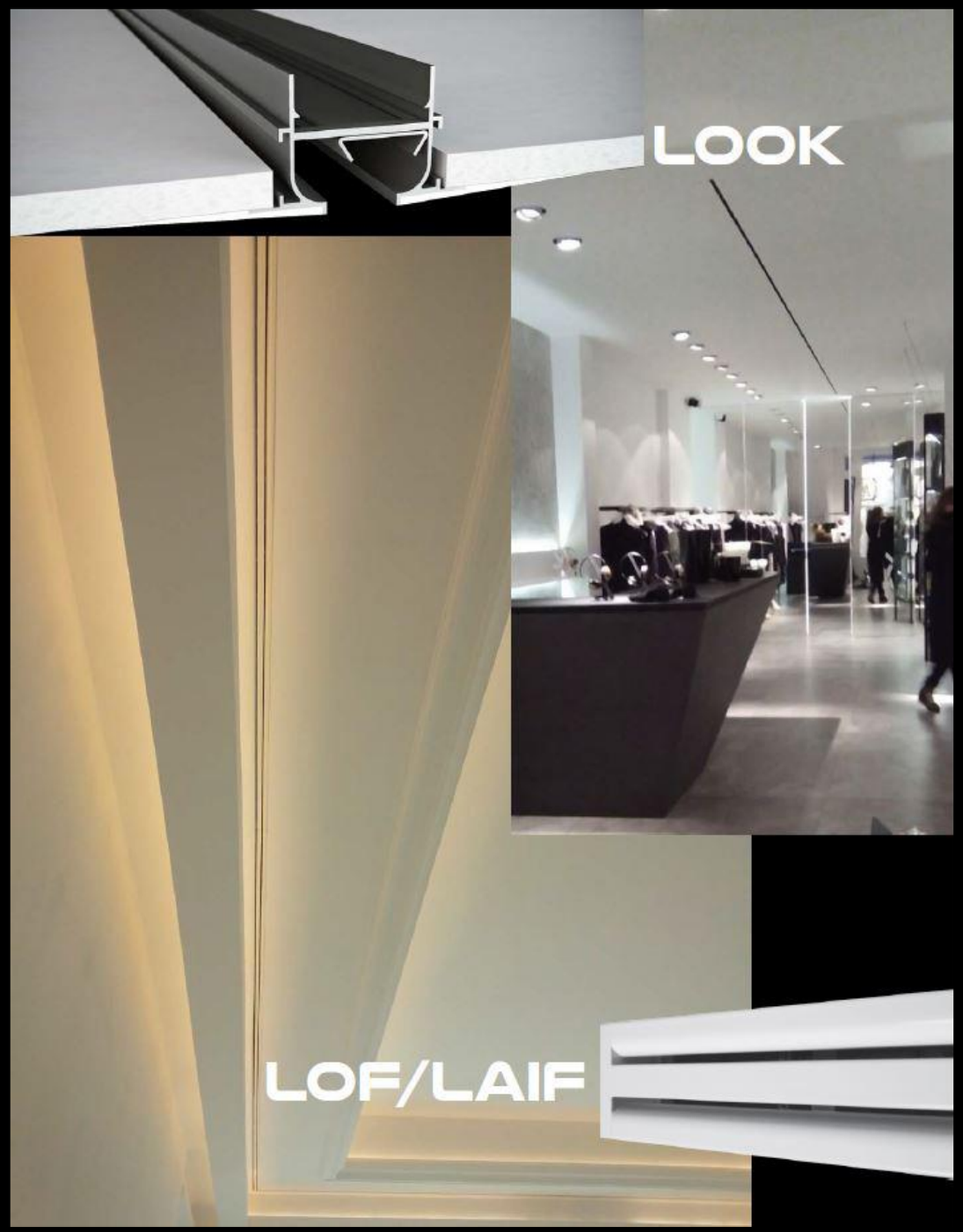
Nozzle Jet Diffusers

Long Throw

Long Throw AND Wide Spread

Architectural Linear Diffusers

Concealed
Adjusable Pattern



Narrow
1 or 2 Way

EFFECTIV HVAC™

THERMAL ADJUSTMENT

HUGE energy savings and comfort improvement when heating and cooling from high ceilings

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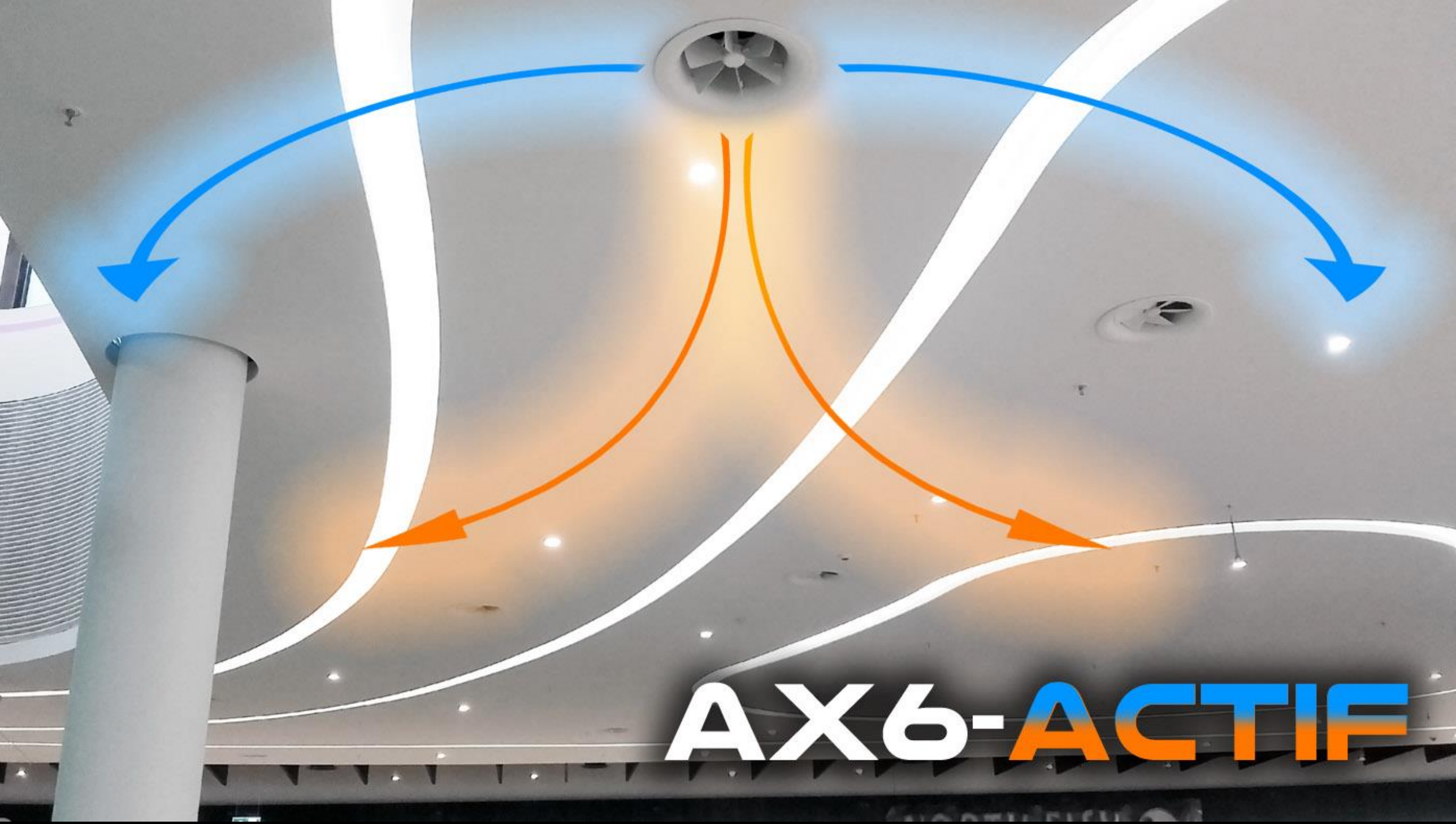
Ideal for gyms, sports centers, open ceiling restaurants, warehouses, industrial, airports, concert halls, convention centers, ...

Thermodynamic diffusers are easy to install and require no extra wiring, electricity or adjustment

DCG-ACTIF

EFFECTIV
HVAC
™



Swirl diffusion, both horizontal and vertical

Also available with protection grille for gymnasiums and sports centers

KAM-ACTIF

Balancing

SKP – Low Pressure

0.2 - 1 in.w.g.

SKC – High Pressure

0.2 - 4 in.w.g.

Constant Air Volume Dampers

Facilitate balancing and ensure a constant cfm despite pressure variations

Also very useful when diffusers are hard to reach for balancing

Balancing

Cable Operated Dampers

Manual

Manual adjustment through face or tile, by means of a screwdriver

Electro-balanced

Remote control powers the dampers, no external power source required

Same remote can control all dampers

Distance is not a limitation

Ultimate Comfort For Shared Office Spaces

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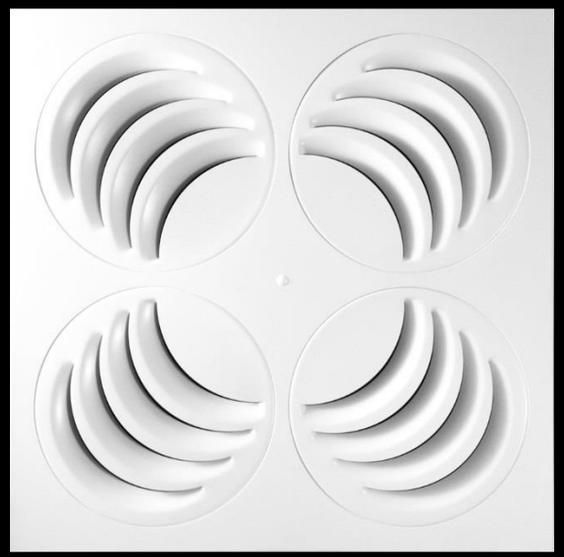
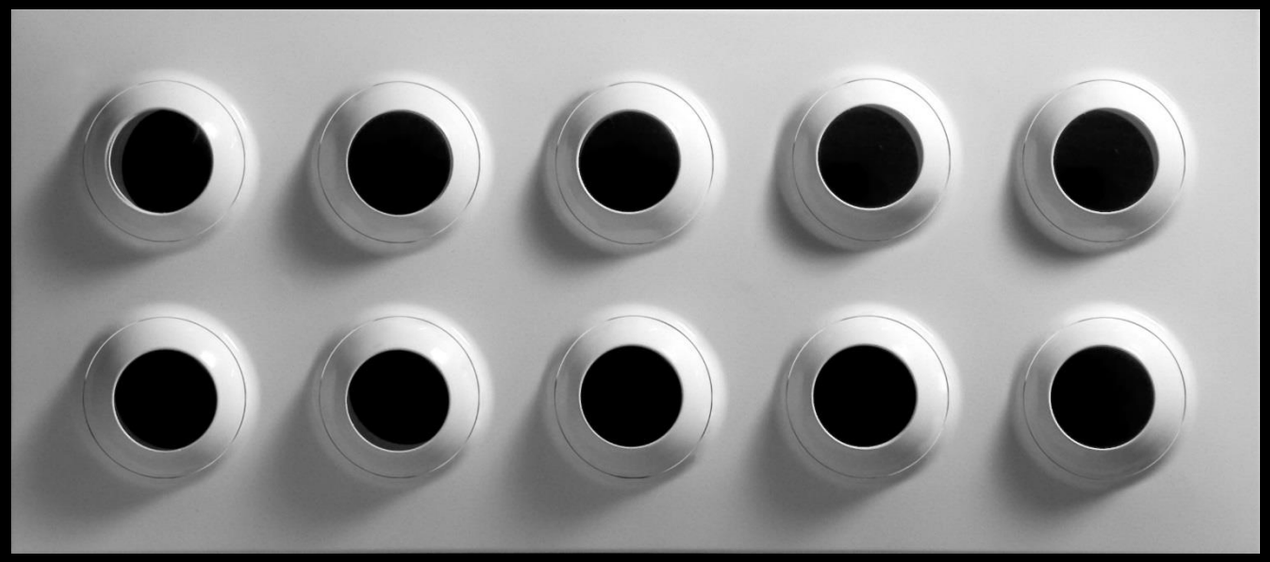


Local adjustment of air volume per diffuser made easier

Adjustment per individual when needed

80% comfort ratio shouldn’t be our ultimate objective for office spaces

Large Indoor Pools & Aquatic Centers



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Throw and spread to reach and cover large windows

Auto-balancing of inaccessible diffusers

Constant air volume ensures perfect throw to reach the windows

Selection Software with CFD

EFFECTIV HVAC

Imperial | en

You are in: Start > Diffusion > Rotational diffusers > Swirl diffusers with fixed concave elements > NEX-S

Rotational diffusers | Swirl diffusers with fixed conc

NEX-S+Plenum/L 24

Numerical results cooling | Graphics air diffusion cooling | Thermal transfer graphics cooling | Numerical results heating | Graphics air diffusion heating | Thermal transfer graphics heating | Graphs of acoustics

Data distribution

Total units	6
Units in x	3
Units in y	2
Dist. To wall x (ft)	6.66
Dist. Elements x (ft)	13.35
Dist. To wall y (ft)	7.51
Dist. Elements y (ft)	15.02

Aerodynamic data

Total air flow (cfm)	2400	Free Area sqf	0.47
Air flow diffuser (cfm)	400	Ak sqf	-
Volume room (m3)	340.47	vf (fpm)	844.49
Movements per hour	11.98	vk (fpm)	-
T. Room °F	23	Dpt (in.w.g)	0.11
T.Supply °F	17.01		
Dt. °F	26.01		

Data deflection

Shock | Wall

AL0r (ft)	14.39	T0r (°F)	22.82
bh0r (ft)	14.39	bv0r (ft)	1.21
bt0r (ft)	-		

Acoustic data

Sound power level

f(Hz)	63	125	250	500	1000	2000	4000	8000	global
Lw(dB(A))	15.29	26.56	32.18	33.36	35.18	33.83	27.67	12.75	40.26

Installation Data

f(Hz)	63	125	250	500	1000	2000	4000	8000	global
Lp(dB)+(beta)	41.4	42.57	40.69	36.47	35.09	32.54	26.58	13.76	40.17
NC-35	60	52	45	40	36	34	33	32	
NR-40	68	56	49	43	40	37	35	32	

Modify parameters

Height occupation ho (ft)	4
Residual velocity Vr(fpm)	39.37
Absorption coefficient (alfa)	0.15
Noise margin	3
T. Room °F	23
T. Supply °F	17.01
Total air flow (cfm)	2400

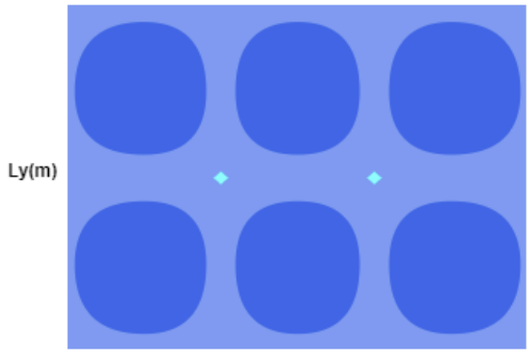
Re-establish | Recalculate

NEX-S+Plenum/L 24

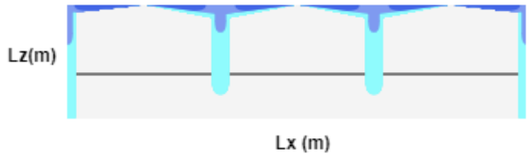
Numerical results cooling | Graphics air diffusion cooling | Thermal transfer graphics cooling | Numerical results heating

Graphics air diffusion heating | Thermal transfer graphics heating | Graphs of acoustics

Top view



Section x



Legend

- Residual velocity 98.43 fpm
- Residual velocity 59.06 fpm
- Residual velocity 39.37 fpm

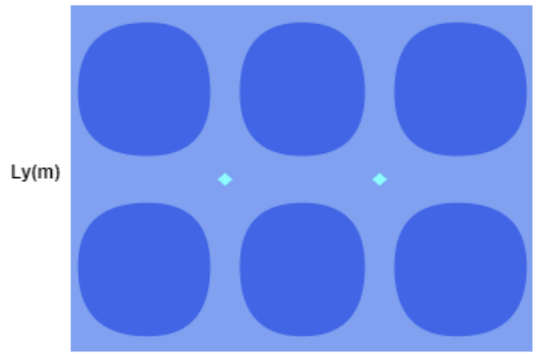
Section y

NEX-S+Plenum/L 24

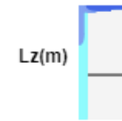
Numerical results cooling | Graphics air diffusion cooling | Thermal transfer graphics cooling | Numerical results heating

Graphics air diffusion heating | Thermal transfer graphics heating | Graphs of acoustics

Top view



Section x



Legend

- 22.55 °F
- 22.73 °F
- 22.84 °F

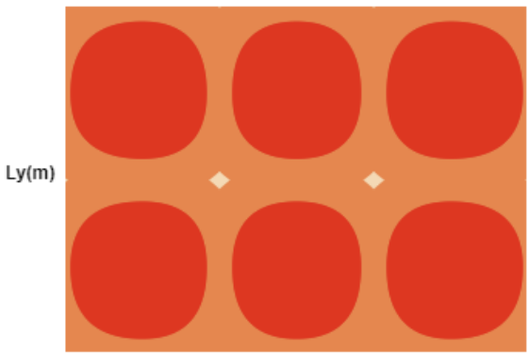
Section y

NEX-S+Plenum/L 24

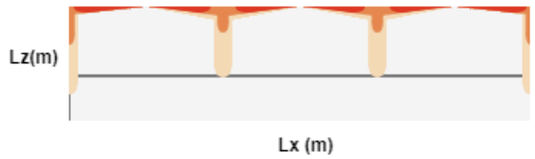
Numerical results cooling | Graphics air diffusion cooling | Thermal transfer graphics cooling | Numerical results heating

Graphics air diffusion heating | Thermal transfer graphics heating | Graphs of acoustics

Top view



Section x



Legend

- Residual velocity 98.43 fpm
- Residual velocity 59.06 fpm
- Residual velocity 39.37 fpm

Section y

NEX-S+Plenum/L 24

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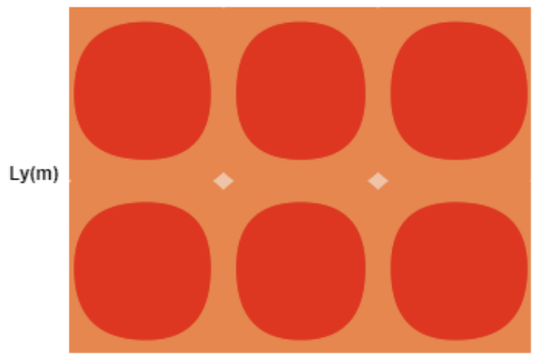
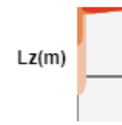
Top view



Section x



Legend

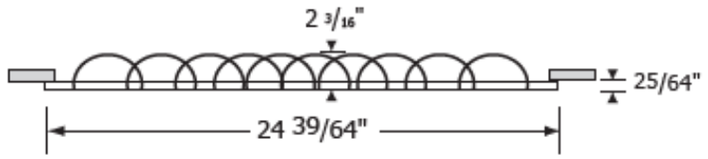
- 21.65 °F
- 21.4 °F
- 21.29 °F

Section y

NEX-C Round Diffuser, Radial Vanes

Dim	Free Area (sqf)	Min cfm	Max cfm
25" (625mm)	0.47	200	500

NEX-C



NEX-C + PERFAIR or PLXOC-R Performance Data

24 5/8" Diameter Face (Imperial) 625mm Diameter Face (Metric)

Neck Size (inches)	Neck (fpm) Velocity	400	500	600	700	800	1000	1200	1400	1600
	Velocity Pressure (H2O)	0.01	0.016	0.022	0.031	0.041	.062	0.09	0.122	0.16
6	CFM	79	98	118	137	157	196	236	275	314
	Pressure Loss (in.w.g.)		-	-	-	-	0.01	0.01	0.01	0.01
	NC		< 15	< 15	< 15	< 15	< 15	17	20	22
	Throw (ft) - Coanda Effect		1-2-4	2-3-4	2-3-5	2-4-6	3-5-7	4-6-9	4-7-10	5-8-12
	Throw (ft) - No Ceiling Effect		1-2-3	1-2-3	2-3-4	2-3-4	2-4-6	3-4-7	3-5-8	4-6-9
8	CFM	140	175	209	244	279	349	419	489	559
	Pressure Loss (in.w.g.)	-	-	0.01	0.01	0.01	0.02	0.02	0.03	0.04
	NC	< 15	< 15	< 15	17	20	24	28	31	34
	Throw (ft) - Coanda Effect	2-3-5	3-4-7	3-5-8	4-6-9	4-7-11	5-9-13	6-10-16	7-12-18	8-14-21
	Throw (ft) - No Ceiling Effect	2-3-4	2-3-5	2-4-6	3-5-7	3-5-8	4-7-10	4-8-12	6-9-14	6-10-16
10	CFM	218	273	327	382	436	545	654		
	Pressure Loss (in.w.g.)	0.01	0.01	0.014	0.018	0.024	0.036	0.052		
	NC	15	20	23	26	29	33	37		
	Throw (ft) - Coanda Effect	3-5-8	4-7-10	5-8-12	6-10-14	7-11-16	8-14-21	10-16-25		
	Throw (ft) - No Ceiling Effect	2-4-6	3-5-8	4-6-9	4-7-11	5-8-12	6-10-15	7-12-19		
12	CFM	314	393	471	550	628				
	Pressure Loss (in.w.g.)	0.01	0.017	0.03	0.04	0.05				
	NC	22	27	30	33	36				
	Throw (ft) - Coanda Effect	5-8-12	6-10-15	7-12-18	8-14-21	9-15-23				
	Throw (ft) - No Ceiling Effect	4-6-9	4-7-11	5-9-13	6-10-16	7-11-17				

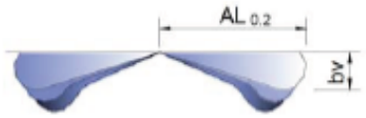
Performance Notes

- NC Value based on 10 db room attenuation.
- Throw Values are based on isothermal air and terminal velocities of 100 fpm, 60 fpm and 40 fpm respectively.

NEX-C + PERFAIR or PLXOC-R Performance Data (continued)

Damper Correction Factor		100% Open	50% Open	10% Open
25"D (625mm)	Pressure Loss	x1	x1.4	x4
	NC	+2	+2.74	+1.5

Delta T Correction Factors		
Δ T (F)	Kh	KI
0	.037	1
-2	.041	.945
-4	.046	.905
-6	.052	.87
-8	.056	.835
-10	.065	.82
-12	.071	.79
-15	.084	.78



bv= kh x Throw

Throw'(Δ T)= KI x Throw

Kh = Correction Factor for Vertical Diffusion
KI = Throw Correction Factor
$AL_{0.2}$ = Distance at which velocity reaches 40 fpm

Ratios		
Throw (ft)	i	Delta T Ratio
4	5	0.12
6	9	0.068
8	13	0.051
10	16	0.04
15	26	0.027
20	38	0.02
25	47	0.016
30	60	-

induced room air = supplied cfm * i

induced room air = cfm mixed for given throw

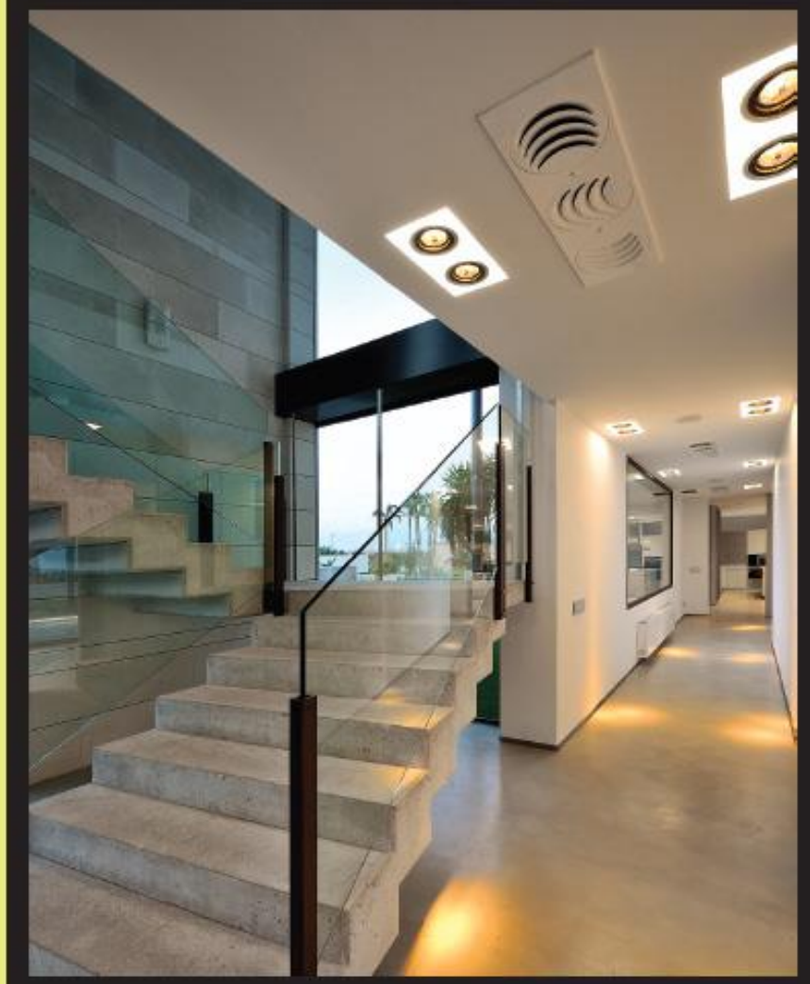
Delta T (Throw) = Delta T (Supply) * Delta T Ratio

Delta T (Supply) = T (Room) - T (Supply)
Delta T (Throw) = T (Room) - T (Throw)

How to Specify NEX-C

Supply and mounting of round high induction swirl diffuser with radial concave elements NEX-C, dimension 25 inches or 625 mm. Constructed from galvanised steel face panel powder coated in white M9016, with ABS elements. Shall be supplied and installed with PERFAIR high performance plenum box featuring integrated air equalizer and volume damper, security tabs, crossbar and long screw for easy face attachment. By EffectiV HVAC / MADEL.

ARCHITECTURE



COMFORT

EFFICIENCY

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