



**PLAY**

**360-Degree Adjustable Diffusers**

**COMFORT THROUGH FLEXIBILITY**

**EFFECTIVE**  
HVAC  TM

Nov 15 2020

## PLAY SERIES

### Adjustable Sectors Diffusers



Full 360 degrees horizontal adjustment



Easy to adjust from the face, without tools



Can act as swirl, 1 Way, 2 Way, 3 Way, 4 Way & more



Architecturally appealing



Provides new solutions for revolutionary designs



Good tolerance to airflow entering the diffuser at an angle



High induction causes rapid reduction of speeds and temperature variations



Square, round and rectangular shapes available



Lay-in, duct mounted or drywall mounted, suitable for all ceilings



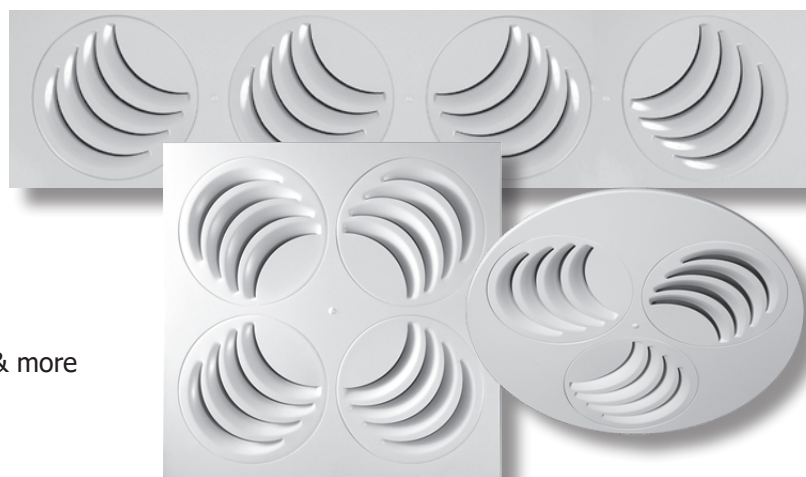
Heavy-gauge, powder coated steel face



Matching high-performance PERFAIR plenums, choice of top or side connection



PERFAIR have built-in anti-seismic attachment tabs and air equalizer/volume damper



**PLAY-R, PLAY-S & PLAY-C**  
by MADEL®

**PATENTED**

Model	Recommended cfm	
	Min	Max
PLAY-C 25	160	315
PLAY-R 48 1 2	200	400
PLAY-S 24	200	400



PLAY Adjustable Sectors Diffusers by EffectiV HVAC™ and MADEL® are designed to be used in air conditioning, ventilation and heating systems at a temperature differential up to 22°F (12° C). They can be mounted in false ceilings, on drywall, or suspended from the ceiling, from 8.5 feet to 13 feet (2.6 up to 4 meters) high.

The PLAY diffusers respond to a large variety of functional and architectural requirements and provide new solutions not previously available, thanks to their manually-adjustable sectors of diffusion.

The adjustment of each sector is made easy by means of partial stoppers which indicate the different positions. According to the direction of the sectors, PLAY diffusers can act as a swirl or directional (1, 2, 3 or 4-way) diffuser.

PLAY diffusers, combined with PERFAIR high performance plenum mixing boxes, emit a uniform airflow throughout the passage section despite variations in supplied air temperature and velocity, as well as non-ideal duct installation.

In any one of their configurations, PLAY diffusers use the coanda effect which creates uniform airflow in all effective areas. The high induction ratio helps reduce stratification. PLAY diffusers allow a flow variation of 60%, keeping the air stream stable.

PLAY diffusers' unique 100% horizontal adjustability, high induction ratio and reduced air stratification allow for designs with a much higher level of comfort and provide opportunity for significant energy savings.

Face and plenum box are ordered separately and attached together with a screw through face which is fixed in plenum crossbar.





## Some Applications



Ideal for applications where conditions and layout may change over time



Ideal when combination of comfort, high cfm, low noise and appealing look is required



PLAY-R is perfect for hallways and large rooms with perimeter supply



Best diffuser for large office spaces with multiple cubicles



Restaurants, bars, hotels, stores, lobbies



Art galleries



Childcare



Schools and classrooms



Meeting rooms



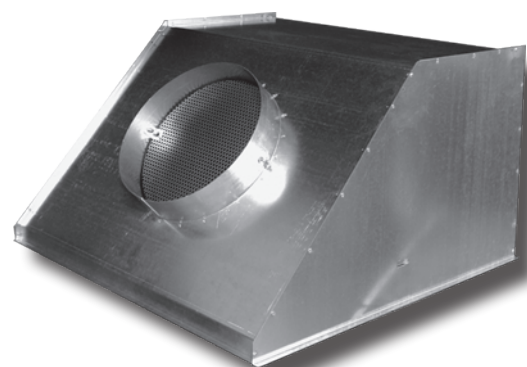
Multi-purpose rooms



## Plenum Selection

PLAY adjustable diffusers are available with a wide selection of PERFAIR plenums to suit any type of application. PERFAIR-SS with side connection is the most popular plenum for Square Diffusers and only requires 14" of ceiling space.

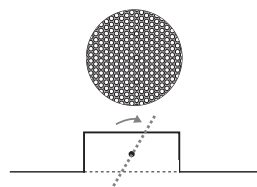
All PERFAIR plenums come with antiseismic tabs and perforated air volume damper / air equalizer.



**PERFAIR-SS**

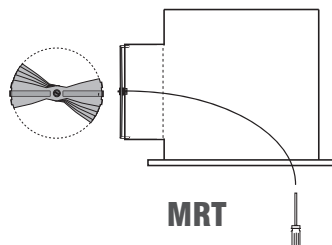
Plenum Model	Face Type	Connection	Recommended For
PERFAIR-CS	Round	Side	False or closed ceiling
PERFAIR-CT	Round	Top	Open ceiling with visible duct coming from top
PERFAIR-RS	Rectangular	Side	Connection coming from side
PERFAIR-RT	Rectangular	Top	Connection coming from top
PERFAIR-SS	Square	Side, Angle	False or closed ceiling
PERFAIR-SSS	Square	Side	Open ceiling with visible duct coming from side
PERFAIR-ST	Square	Top	Open ceiling with visible duct coming from top
PERFAIR-XS	Square	Side, Oval	Very limited ceiling space (6" min)
PERFAIR-XSS	Square	Side, Rect.	Very limited ceiling space (5" min)

## Integrated Air Volume Dampers



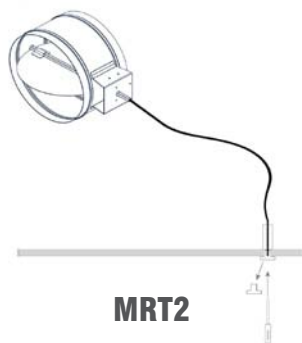
**R**

Perforated damper + air equalizer (Standard)



**MRT**

Manually operated damper, cable inside the plenum, adjustment through face



**MRT2**

Manually operated damper, cable through wall with termination fixture



**EB**

Battery operated electro-balance damper with remote control, cable through face



**EB2**

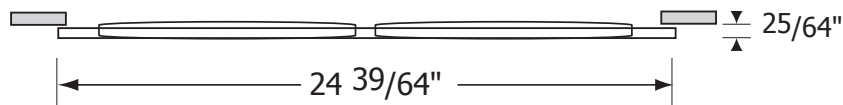
Battery operated electro-balance damper with remote control, cable through wall with termination fixture

## PLAY-C Adjustable Sectors Round Diffuser

Dim	Free Area (sqf)	Min cfm	Max cfm
25" (625mm)	0.323	160	315



**PLAY-C**



## PLAY-C + PERFAIR or PLXOC Performance Data

24 5/8" Diameter Face (Imperial)

625mm Diameter Face (Metric)

Neck Size (inches)	Neck (fpm) Velocity	200	300	400	500	600	700	800	1000
	Velocity Pressure (H2O)	0.002	0.006	0.01	0.016	0.022	0.031	0.041	.062
6	CFM				98	118	137	157	196
	Pressure Loss (in.w.g.)				0.02	0.029	0.038	0.049	0.073
	NC				< 15	< 15	< 15	15	22
	Throw (ft) - Coanda Effect				2-3-4	2-3-5	2-4-6	3-4-7	3-5-8
	Throw (ft) - No Ceiling Effect				1-2-3	2-3-4	2-3-4	2-3-5	2-4-6
8	CFM	70	105	140	175	209	244	279	349
	Pressure Loss (in.w.g.)	0.011	0.023	0.039	0.06	0.083	0.11	0.141	0.215
	NC	< 15	< 15	< 15	19	24	28	32	38
	Throw (ft) - Coanda Effect	1-2-3	2-3-5	2-4-6	3-5-8	4-6-9	4-7-10	5-8-11	6-9-14
	Throw (ft) - No Ceiling Effect	1-2-2	1-2-4	2-3-5	2-4-6	3-4-7	3-5-8	3-6-9	4-7-11
10	CFM	109	164	218	273	327	382		
	Pressure Loss (in.w.g.)	0.024	0.053	0.09	0.136	0.19	0.255		
	NC	< 15	17	24	31	36	41		
	Throw (ft) - Coanda Effect	2-3-5	3-5-7	4-6-9	4-8-11	5-9-13	6-10-15		
	Throw (ft) - No Ceiling Effect	1-2-4	2-4-5	3-5-7	3-6-8	4-7-10	5-8-11		

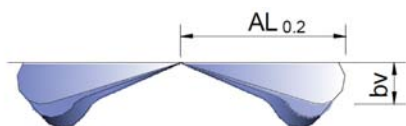
### Performance Notes

- 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.

## PLAY-C + PERFAIR or PLXOC Performance Data (continued)

Damper Correction Factor		100% Open	50% Open	10% Open
25"D (625mm)	Pressure Loss	x 1	x 1	x 1.4
	NC	+0.8	+0.7	+1.2

Delta T Correction Factors		
$\Delta T$ (F)	Kh	KI
0	.039	1
-2	.042	.965
-4	.046	.93
-6	.05	.91
-8	.055	.86
-10	.065	.84
-12	.074	.82
-15	.099	.78



$$bv = kh \times \text{Throw}$$

$$\text{Throw}'(\Delta T) = KI \times \text{Throw}$$

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	6	0.08
6	9	0.05
8	13	0.037
10	16	0.029
15	25	0.018
20	34	-
25	43	-
30	52	-

$$\text{induced room air} = \text{supplied cfm} \times i$$

$$\text{induced room air} = \text{cfm mixed for given throw}$$

$$\text{Delta T (Throw)} = \text{Delta T (Supply)} \times \text{Delta T Ratio}$$

$$\text{Delta T (Supply)} = T(\text{Room}) - T(\text{Supply})$$

$$\text{Delta T (Throw)} = T(\text{Room}) - T(\text{Throw})$$

## How to Specify PLAY-C

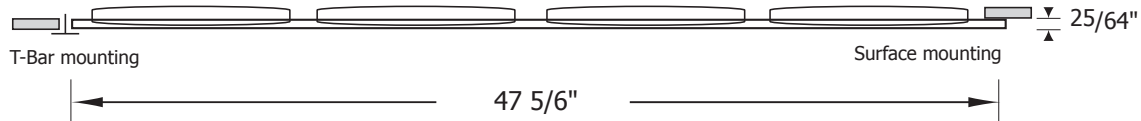
Supply and mounting of round diffuser with three individually adjustable sectors PLAY-C, dimension 25 inches or 625 mm. Airflow adjustment of each sector shall be strictly horizontal and 360 degrees. Constructed from galvanized steel face panel powder coated in white M9016. Shall be supplied and installed 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.

## PLAY-R Adjustable Sectors Rectangular Diffuser

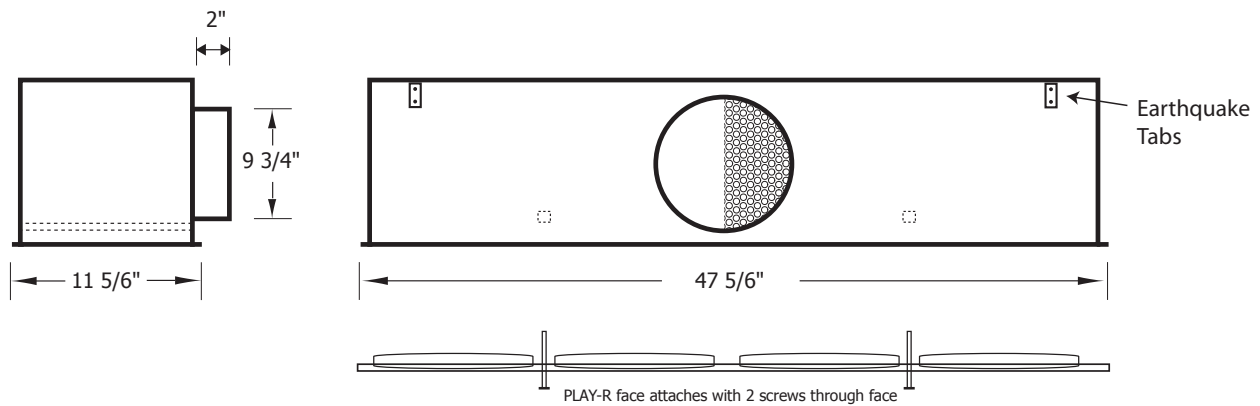
Dim	Free Area (sqf)	Min cfm	Max cfm
25" (625mm)	0.431	200	400



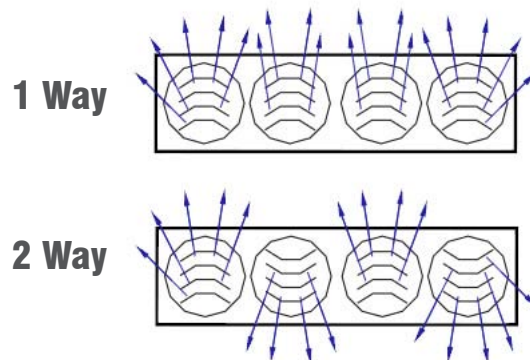
**PLAY-R**



## PLAY-R Installation in Plenum



## PLAY-R + PERFAIR or PLXOR Performance Data





## PLAY-R + PERFAIR or PLXOR Performance Data (continued)

48" x 12" Face (Imperial)

1215 mm x 299 mm Face (Metric)

Neck Size (inches)	Neck (fpm) Velocity		200	300	400	500	600	700	800	1000
	Velocity Pressure (H <sub>2</sub> O)		0.01	0.016	0.01	0.016	0.022	0.031	0.041	.062
6	CFM				79	98	118	137	157	196
	Pressure Loss (in.w.g.)				0.011	0.012	0.019	0.026	0.033	0.043
	NC				< 15	< 15	< 15	< 15	< 15	15
	Throw (ft)	2 Way			1-3-5	2-4-6	3-4-6	3-4-6	3-4-7	4-5-7
		1 Way			4-7-12	5-7-12	6-9-15	6-10-16	7-12-19	8-14-21
8	CFM		70	105	140	175	209	244	279	349
	Pressure Loss (in.w.g.)		0.01	0.013	0.027	0.039	0.048	0.065	0.081	0.128
	NC		< 15	< 15	< 15	< 15	16	20	24	30
	Throw (ft)	2 Way	1-3-5	2-4-6	3-4-6	3-4-7	4-5-7	5-7-11	5-8-12	7-11-16
		1 Way	4-6-11	5-8-13	6-10-16	8-13-21	8-14-21	10-16-24	10-17-25	
10	CFM		109	164	218	273	327	382	436	545
	Pressure Loss (in.w.g.)		0.014	0.032	0.05	0.08	0.11	0.14	0.18	0.24
	NC		< 15	< 15	17	23	28	32	36	42
	Throw (ft)	2 Way	2-4-6	3-3-5	4-6-9	5-8-12	6-10-15	7-11-17	7-12-19	9-14-22
		1 Way	5-8-13	7-12-19	9-15-23	10-17-25	13-22-33			
12	CFM		157	236	314	393	471	550		
	Pressure Loss (in.w.g.)		0.026	0.059	0.087	0.144	0.192	0.245		
	NC		< 15	20	26	34	38	43		
	Throw (ft)	2 Way	3-4-6	4-7-10	6-9-14	7-11-18	8-13-21	9-14-23		
		1 Way	6-10-16	9-16-24	12-20-29					

## Performance Notes

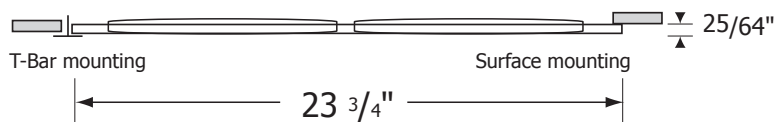
- NC Value based on 10 db room attenuation.
- Throw Values are based on isothermal air and terminal velocities of **100 fpm, 60 fpm and 40 fpm** respectively.

Damper Correction Factor		100% Open	50% Open	10% Open
48"x12"	Pressure Loss	x 1	x 1.5	x 2.3
	NC	+0.7	+1.7	+2.4

## How to Specify PLAY-R

Supply and mounting of rectangular diffuser PLAY-R with four individually adjustable sectors, dimension 48 inches x 12 inches (1215 mm x 299 mm). Airflow adjustment of each sector shall be strictly horizontal and 360 degrees. Constructed from galvanized steel face panel powder coated in white M9016. 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.

## PLAY-S Adjustable Sectors Square Diffuser



**PLAY-S  
(4-Way)**



**1-Way**



**2-Way**



**3-Way**



**Swirl**

## Solve Existing Problems, Prevent Future Ones



Easily replace standard diffusers in existing buildings to fix current issues



Prevent AC wars in large office spaces



Stop creating new problems while trying to solve existing ones



Also great for new buildings with architectural and physical challenges



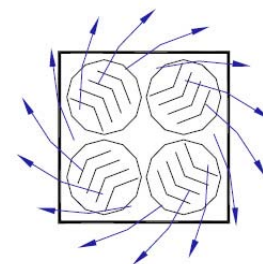
Equip your new building with the PLAY to cost efficiently deal with future problems



Just PLAY with it! Happy customers and employees are good for your business!

## PLAY-S (Swirl) + PERFAIR or BOXSTAR Performance Data

Dim	Free Area (sqf)	Min cfm	Max cfm
24"x24" (605mm)	0.43	200	400



**Swirl**

24" x 24" Face, Swirl Effect

605 mm x 605 mm Face (Metric)

Neck Size (inches)	Neck (fpm) Velocity	200	300	400	500	600	700	800	1000
	Velocity Pressure (H <sub>2</sub> O)	0.002	0.006	0.01	0.016	0.022	0.031	0.041	.062
6	CFM				98	118	137	157	196
	Pressure Loss (in.w.g.)				0.01	0.014	0.019	0.024	0.037
	NC				< 15	< 15	< 15	< 15	16
	Throw (ft) - Coanda Effect				2-2-4	2-3-4	2-3-5	2-4-6	3-5-7
	Throw (ft) - No Ceiling				1-2-3	1-2-3	2-3-4	2-3-4	2-4-5
8	CFM		105	140	175	209	244	279	349
	Pressure Loss (in.w.g.)		0.011	0.02	0.03	0.041	0.055	0.071	0.107
	NC		< 15	< 15	< 15	18	22	25	31
	Throw (ft) - Coanda Effect		2-3-4	2-3-5	3-4-6	3-5-7	3-6-9	4-6-10	5-8-12
	Throw (ft) - No Ceiling		1-2-3	2-3-4	2-3-5	2-4-6	3-4-6	3-5-7	4-6-9
10	CFM	109	164	218	273	327	382	436	545
	Pressure Loss (in.w.g.)	0.012	0.026	0.045	0.068	0.095	0.127	0.163	0.247
	NC	< 15	< 15	19	25	30	34	37	43
	Throw (ft) - Coanda Effect	2-3-4	2-4-6	3-5-8	4-6-10	4-8-11	5-9-13	6-10-15	9-16-24
	Throw (ft) - No Ceiling	1-2-3	2-3-4	2-4-6	3-5-7	3-6-8	4-6-10	4-7-11	7-12-18
12	CFM	157	236	314	393	471	550		
	Pressure Loss (in.w.g.)	0.024	0.052	0.088	0.134	0.188	0.251		
	NC	< 15	21	29	35	39	44		
	Throw (ft) - Coanda Effect	2-4-6	3-6-8	4-7-11	5-9-13	6-10-16	7-12-18		
	Throw (ft) - No Ceiling	2-3-4	3-4-6	3-5-8	4-7-10	5-8-12	5-9-14		

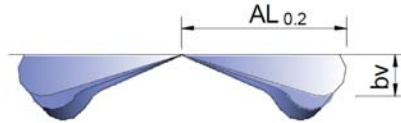
### Performance Notes

- 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.

Damper Correction Factor		100% Open	50% Open	10% Open
24"x24"	Pressure Loss	x 1	x1.5	x 2.3
	NC	+0.8	+1.7	+1.7

# PLAY-S (Swirl) + PERFAIR or BOXSTAR Performance Data (continued)

Delta T Correction Factors		
$\Delta T$ (F)	Kh	KI
0	.039	1
-2	.042	.965
-4	.046	.93
-6	.05	.91
-8	.055	.86
-10	.065	.84
-12	.074	.82
-15	.099	.78



$$bv = kh \times \text{Throw}$$

$$\text{Throw}'(\Delta T) = KI \times \text{Throw}$$

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	7	0.092
6	12	0.059
8	14	0.043
10	18	0.034
15	28	0.023
20	40	0.017
25	49	-
30	61	-

$$\text{induced room air} = \text{supplied cfm} \times i$$

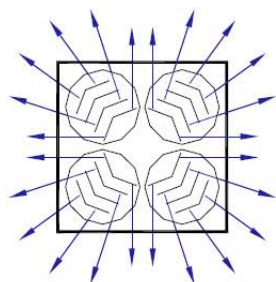
induced room air = cfm mixed for given throw

$$\text{Delta T (Throw)} = \text{Delta T (Supply)} \times \text{Delta T Ratio}$$

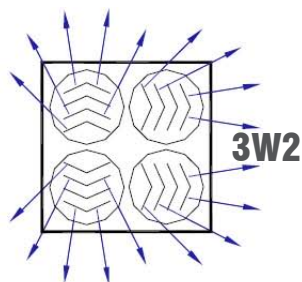
$$\text{Delta T (Supply)} = T(\text{Room}) - T(\text{Supply})$$

$$\text{Delta T (Throw)} = T(\text{Room}) - T(\text{Throw})$$

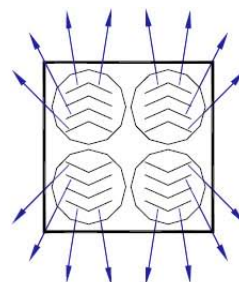
## PLAY-S (Directional) + PERFAIR or BOXSTAR Performance Data



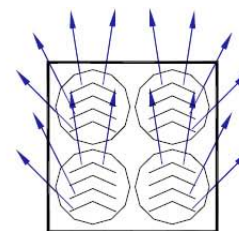
4 Way



3 Way



2 Way



1 Way

24" x 24" Face, Directional Throw

605 mm x 605 mm Face (Metric)

Neck Size (inches)	Neck (fpm) Velocity		200	300	400	500	600	700	800	1000
	Velocity Pressure (H2O)		0.002	0.006	0.01	0.016	0.022	0.031	0.041	.062
6	CFM				79	98	118	137	157	196
	Pressure Loss (in.w.g.)				0.003	0.01	0.014	0.019	0.024	0.037
	NC				< 15	< 15	< 15	< 15	< 15	16
	Throw (ft)	4W, 3W			2-3-4	2-4-5	2-4-6	3-5-7	3-6-8	3-6-9
		3W2, 2W			3-6-10	4-7-11	4-8-12	5-9-14	6-11-16	7-13-19
		1W			5-9-13	6-10-13	6-11-16	7-12-18	8-14-21	10-17-25
8	CFM		70	105	140	175	209	244	279	349
	Pressure Loss (in.w.g.)		0.007	0.011	0.02	0.03	0.041	0.055	0.071	0.107
	NC		< 15	< 15	< 15	< 15	18	22	25	31
	Throw (ft)	4W, 3W	2-3-4	2-4-5	3-5-7	3-6-9	4-7-10	5-8-12	5-8-13	7-11-16
		3W2, 2W	3-6-10	4-7-11	5-9-14	7-12-18	8-14-21	9-16-24	10-17-26	13-22-34
		1W	5-9-12	6-10-14	7-12-18	9-16-24	11-18-27	12-20-30	13-22-33	17-28-42
10	CFM		109	164	218	273	327	382	436	545
	Pressure Loss (in.w.g.)		0.012	0.026	0.045	0.068	0.095	0.127	0.163	0.247
	NC		< 15	< 15	17	23	28	32	36	42
	Throw (ft)	4W, 3W	2-4-5	3-5-8	4-7-10	5-8-13	6-10-15	7-11-17	8-13-19	9-16-24
		3W2, 2W	4-7-11	6-11-16	8-14-21	10-17-26	12-20-32	14-23-35	16-26-39	19-32-48
		1W	6-10-14	8-14-21	11-18-27	13-22-33	16-26-39	18-30-45	20-34-51	25-42-63
12	CFM		157	236	314	393	471	550		
	Pressure Loss (in.w.g.)		0.024	0.052	0.088	0.134	0.188	0.251		
	NC		< 15	21	28	34	39	43		
	Throw (ft)	4W, 3W	4-6-9	5-8-12	6-9-14	7-12-18	9-15-22	9-16-24		
		3W2, 2W	7-13-19	9-16-24	11-19-29	15-24-37	18-29-44	19-32-48		
		1W	10-16-24	12-20-30	15-24-36	19-32-48	23-38-57	25-42-63		

## 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
- Throw Values are with Coanda Effect. If no ceiling, multiply values by 0.75



Dim	Free Area (sqf)	Min cfm	Max cfm
24"x24" (605x605mm)	0.43	150	400

Damper Correction Factor		100% Open	50% Open	10% Open
24"x24" (605x605mm)	Pressure Loss	x 1	x 1.5	x 2.3
	NC	+0.8	+1.7	+1.7

## How to Specify PLAY-S

Supply and mounting of square diffuser PLAY-S with four individually adjustable sectors, dimension 24 inches x 24 inches (605 mm x 605 mm). Airflow adjustment of each sector shall be strictly horizontal and 360 degrees. Constructed from galvanized steel face panel powder coated in white M9016. 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.

## How to Order PLAY Series

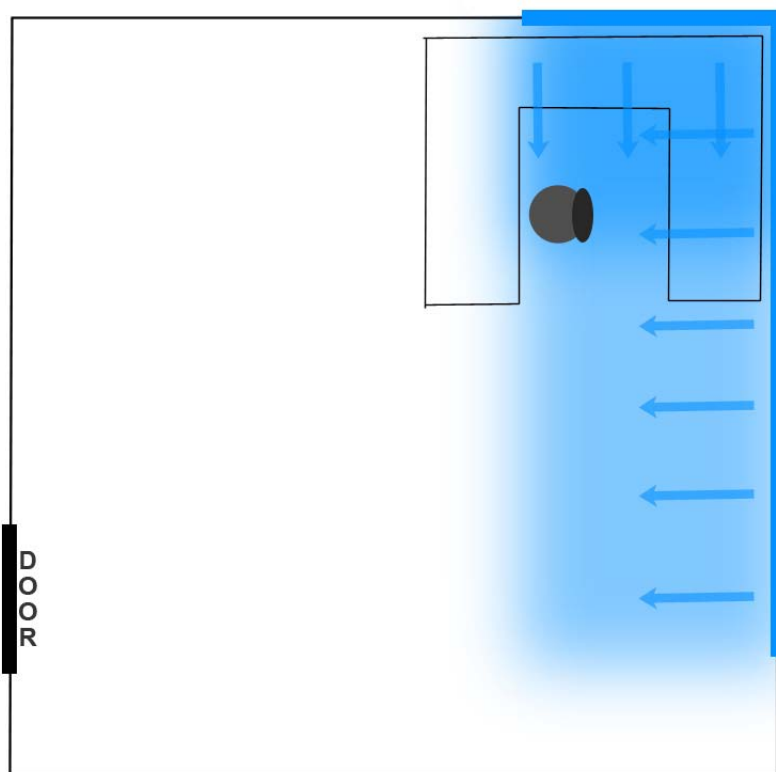
PLAY-	S	24	+ PERFAIR-ST	24	10
					Neck Diameter
					6" 8", 10" or 12" D
					Face Dimension
					Match Product Face
					PERFAIR-CS
					Round, Side Connection
					PERFAIR-CT
					Round, Top Connection
					PERFAIR-SS
					Square, Side Connection
					PERFAIR-ST
					Square, Top Connection
					PERFAIR-RS
					Rectangular, Side Connection
					PERFAIR-RT
					Rectangular, Top Connection
					24
					24"x24" Square Face
					25
					25" Diameter Face
					36 12
					36"x12" Rectangular Face
					48 12
					48"x12" Rectangular Face
					C
					Round
					R
					Rectangular
					S
					Square

## Simple Energy Saving Example - Small Office With Large Window

This is a simple example of how the PLAY Adjustable Diffuser can help save energy while improving the level of comfort. This example is for a closed office but could also apply to any other commercial space with large windows and other random sources of heat and cold.

In this example, the small closed office has a large corner window – also covering most of one of the walls. In the winter, the large window becomes a considerable source of heat loss and the area around the window feels really cold. The exact opposite happens in hot summer days. In both cases, the result is serious discomfort for the employee.

This is not fiction; as a matter of fact, it is a real example of an existing building. As we often see in small closed offices, this one had a single standard ceiling diffuser installed in the center of the room. Many solutions were tried to improve the level of comfort; one being the use of zoning and volume control to supply more conditioned air to the room in order to compensate for heat gain or loss. The obvious problem with this solution is that it consumes a lot more energy. Moreover, some of the over-heated or over-cooled air is sent directly throughout the door into an already well-conditioned space. Last but not least, we might end up with a relatively comfortable zone on the right side of the room, but at the expense of the left side of the room now being too cold or too hot.



### The Solution

In order to efficiently solve that problem, what we really need is to supply more conditioned air concentrated towards the window. Yet we want to supply some conditioned air towards the rest of the room in order to avoid critical stratification and to keep room temperature as even and stable as possible. Ideally, we would rather avoid sending air directly throughout that door. Introducing the PLAY Adjustable Diffuser! The two pictures below show two different views of that office with the PLAY diffuser installed. One picture is taken from the door towards the window and the other one from the window towards the door.

View from door



View from window

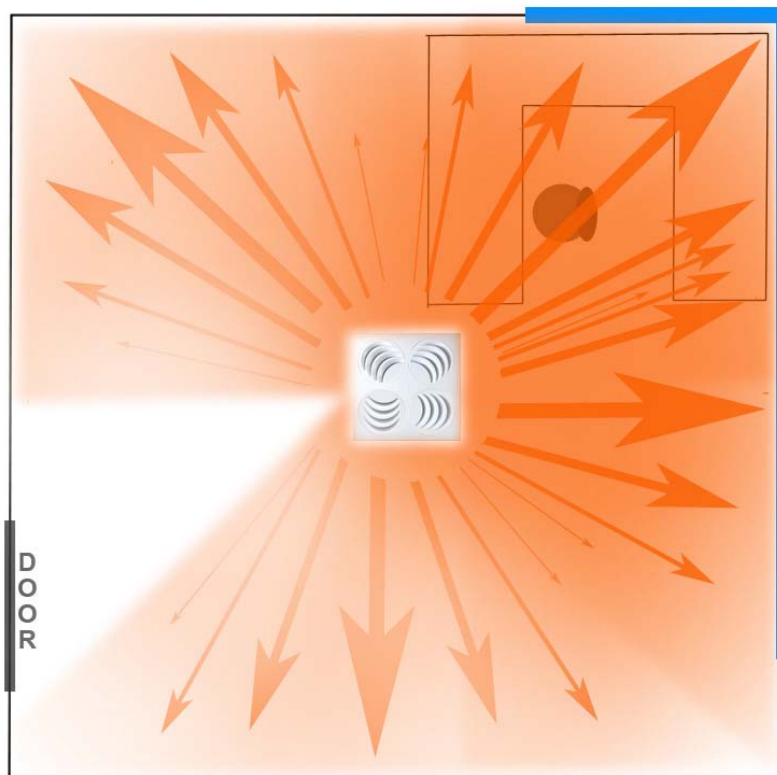


## Simple Energy Saving Example - Small Office With Large Window

As you can see, the 4 sectors have been numbered to explain the configuration:

- Sector 1 is directed towards the windowed corner of the room.
- Sector 2 covers the rest of the windowed wall.
- Sector 3 covers the left corner, away from the door.
- Sector 4 covers the back wall, also away from the door.

View from above



**In this example, we have reached the highest possible level of comfort in the most energy efficient way.**

The PLAY is the only diffuser which is currently able to achieve this. A one-way, two-way or three-way diffuser would not have supplied air in the room efficiently as the PLAY; furthermore, they would have created stratification zones. Creating an air curtain with linear diffusers in front of the window is also great solution; however, it involves extra ducting and installation, resulting in much higher costs.

The PLAY adjustable diffuser is the easiest, most cost-effective way to achieve optimal results in such applications.

# PLAY

## Adjustable Sectors Diffusers



The ultimate toys for architects and engineers, PLAY diffusers combine innovative looks with versatile performance, providing both attractive designs and increased comfort levels. PLAY diffusers are the only diffusers on the market today which allow for the full and simple horizontal adjustment of airflow, from the face and with no need for 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*

**EFFECTIVE**  
HVAC