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Ice Machines & Cooling Systems

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ROUND SWIRL AIR DIFFUSERS

Data Sheet

Product Data Sheet

Product Overview

The ICEMAC Round Swirl Air Diffuser is designed to provide high-performance air distribution through a dynamic swirl effect. This diffuser effectively ensures uniform air mixing, maintaining optimal thermal comfort in both commercial and industrial settings. With its aerodynamic blade structure and durable materials, it is suitable for installation in spaces with a minimum ceiling height of 3.5 meters, such as shopping malls, cinemas, sports halls, and conference rooms.

Available in fixed or adjustable blade models, this versatile diffuser caters to diverse ventilation requirements, whether for winter heating or summer cooling. Its advanced construction guarantees efficient air throw, reduced energy consumption, and seamless integration into modern HVAC systems.

Materials and Construction

Material:

The ICEMAC Round Swirl Air Diffuser is crafted for durability and high performance in demanding environments:

- **Casing Material:** Precision-formed using 1 mm galvanized or DKP steel through advanced spinning techniques, ensuring strength and longevity.
- **Blade Material:** High-quality galvanized or DKP steel, engineered for precise air distribution and resistance to wear.
- **Optional Materials:** Aluminum or stainless steel variants are available for applications requiring enhanced corrosion resistance or aesthetic compatibility.

Variants:

- **ICR-A (Fixed Blade Model):** Features a static blade configuration for consistent air distribution and straightforward operation.
- **ICR-B (Adjustable Blade Model):** Allows blade angle adjustment manually or via servo motor for optimal airflow control in varying operational conditions, such as summer cooling or winter heating.

Surface Finishing

The ICEMAC Round Swirl Air Diffuser is finished with premium coatings to ensure durability, corrosion resistance, and aesthetic compatibility with diverse environments:

- **Standard Coating:** Electrostatic powder coating in RAL 9010 (Pure White) or RAL 9016 (Traffic White), providing a smooth and professional finish.
- **Custom Finishes:** Optional coatings available in the full RAL color spectrum to match specific project aesthetics or design requirements.

Assembly Options

The ICEMAC Round Swirl Air Diffuser is designed for straightforward and secure installation, accommodating various HVAC configurations and architectural needs:

- **Standard Mounting:** Fixed securely using screws, ensuring stability and precision alignment during operation.
- **Plenum Box Integration:** Optional plenum box (PK) for seamless connection to duct systems, enhancing airflow distribution and efficiency.

Blade Adjustment Mechanisms:

- Manual control for accessible and precise airflow customization.
- Servo motor integration for automated blade adjustment, enabling advanced control in dynamic operational settings.

Applications

The ICEMAC Round Swirl Air Diffuser is engineered to deliver precise and efficient air distribution, making it indispensable for ensuring thermal comfort and air quality in various environments. Its adaptable design supports diverse HVAC requirements:

- **Large Commercial Spaces**: Guarantees uniform air mixing in shopping malls, cinemas, theatres, and airports, enhancing comfort across expansive areas.
- **Industrial Applications**: Optimizes air distribution in warehouses, factories, and production areas, effectively managing ventilation in high-ceiling environments.
- **Event and Exhibition Venues**: Ensures consistent air quality and temperature control in sports arenas, conference halls, and exhibition spaces, providing comfort even during peak occupancy.
- **High-Ceiling Facilities**: Ideal for installations in spaces with ceiling heights ranging from 3.5 to 10 meters, ensuring effective heating and cooling in large-scale environments.

The ICEMAC Round Swirl Air Diffuser is the ideal solution for commercial, industrial, and public spaces requiring efficient ventilation, energy efficiency, and adaptable design.

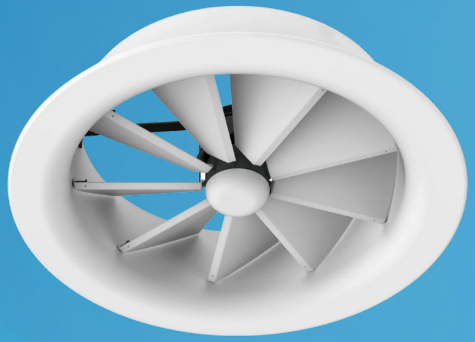
Accessories

Enhance the ICEMAC Round Swirl Air Diffuser with optional accessories for improved functionality:

- **Plenum Box (PK):** Ensures smooth duct integration and optimized airflow distribution.
- **Servo Motor (SM):** Enables automated blade adjustment for precise airflow control.
- **Dampers:** Options for para*0p0llel or opposed blade dampers to regulate airflow.
- **Flywire Mesh:** Prevents entry of small particles while maintaining airflow efficiency.

ICEMAC Round Swirl Air Diffuser

This table allows for quick and easy selection of the appropriate Louvers



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ICEMAC Round Swirl Air Diffuser Dimensions and Effective Areas

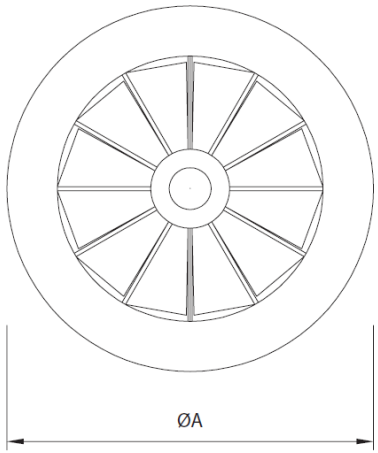
The ICEMAC Round Swirl Air Diffuser is available in a variety of sizes and configurations to accommodate diverse installation requirements and ensure optimal air distribution. Each size is meticulously designed to provide compatibility with modern HVAC systems, maintaining exceptional performance in both airflow and thermal comfort. Below are detailed tables outlining the dimensions and effective areas for each model:

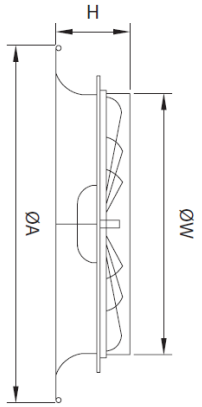
ICR-A: Fixed Blade Round Swirl Diffuser

Nominal Diameter (mm)	*Effective Area (Aeff) (m^2)*	*Neck Diameter (ØW) (mm)*	*Overall Diameter (ØA) (mm)*	*Height (H) (mm)*
250	0.031	246	395	110
315	0.055	311	460	120
400	0.094	396	545	120
500	0.156	496	645	125

ICR-B: Adjustable Blade Round Swirl Diffuser

Nominal Diameter (mm)	*Effective Area (Aeff) (m^2)*	*Neck Diameter (ØW) (mm)*	*Overall Diameter (ØA) (mm)*	*Height (H) (mm)*
315	0.059	311	460	120
400	0.098	396	545	120
500	0.163	496	645	125
630	0.257	626	775	130
800	0.434	796	945	130





Round Swirl Air Diffuser

ICR - A

Fixed Blade

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ICR-A: Fixed Blade Round Swirl Diffuser Quick Selection Table

V (m³/h)		Nominal Diameter (mm)			
		250	315	400	500
100	ueff. (m/s)	0.9			
	Xmin - Xmax (m)	1.1 - 2.7			
	ΔPt (Pa)	6			
	SPL (dBA)	18			
150	ueff. (m/s)	1.3	0.8		
	Xmin - Xmax (m)	1.6 - 4.0	1.2 - 2.9		
	ΔPt (Pa)	13	4		
	SPL (dBA)	23	14		
200	ueff. (m/s)	1.8	1	0.6	
	Xmin - Xmax (m)	1.9 - 4.8	1.5 - 3.8	1.8 - 4.6	
	ΔPt (Pa)	18	6	3	
	SPL (dBA)	27	18	14	
250	ueff. (m/s)	2.2	1.3	0.7	
	Xmin - Xmax (m)	2.4 - 6.0	1.9 - 4.6	2.1 - 5.4	
	ΔPt (Pa)	27	8	7	
	SPL (dBA)	33	20	19	
300	ueff. (m/s)		1.5	0.9	
	Xmin - Xmax (m)		2.3 - 5.6	2.3 - 5.8	
	ΔPt (Pa)		13	8	
	SPL (dBA)		27	24	
350	ueff. (m/s)		1.8	1	
	Xmin - Xmax (m)		2.7 - 6.6	2.5 - 6.5	
	ΔPt (Pa)		17	12	
	SPL (dBA)		30	28	
400	ueff. (m/s)		2	1.2	0.7
	Xmin - Xmax (m)		3.1 - 7.7	2.9 - 7.4	2.2 - 5.2
	ΔPt (Pa)		23	15	5
	SPL (dBA)		34	31	16
450	ueff. (m/s)		2.3	1.3	0.8
	Xmin - Xmax (m)		3.6 - 8.8	3.0 - 8.0	2.6 - 6.8
	ΔPt (Pa)		28	17	12
	SPL (dBA)		38	33	28
500	ueff. (m/s)		2.5	1.5	0.9
	Xmin - Xmax (m)		4.1 - 9.6	3.4 - 8.9	2.9 - 7.8
	ΔPt (Pa)		35	22	28
	SPL (dBA)		42	37	34
600	ueff. (m/s)			1.8	1.1
	Xmin - Xmax (m)			4.4 - 11.0	3.5 - 9.5
	ΔPt (Pa)			35	31
	SPL (dBA)			42	37
700	ueff. (m/s)			2.1	1.2
	Xmin - Xmax (m)			5.1 - 12.9	4.6 - 11.1
	ΔPt (Pa)			43	36
	SPL (dBA)			45	42
800	ueff. (m/s)				1.4
	Xmin - Xmax (m)				5.2 - 11.8
	ΔPt (Pa)				40
	SPL (dBA)				45
900	ueff. (m/s)				1.6
	Xmin - Xmax (m)				5.5 - 12.2
	ΔPt (Pa)				42
	SPL (dBA)				46
1000	ueff. (m/s)				1.8
	Xmin - Xmax (m)				5.8 - 12.6
	ΔPt (Pa)				46
	SPL (dBA)				48
1100	ueff. (m/s)				2
	Xmin - Xmax (m)				6.1 - 13.2
	ΔPt (Pa)				49
	SPL (dBA)				51
1200	ueff. (m/s)				2.1
	Xmin - Xmax (m)				6.4 - 13.8
	ΔPt (Pa)				51
	SPL (dBA)				52
1300	ueff. (m/s)				2.3
	Xmin - Xmax (m)				7.0 - 14.5
	ΔPt (Pa)				54
	SPL (dBA)				57

Aeff (m²):	Effective area
Ueff (m/s):	Effective velocity
V (m³/h):	Air flow rate
ΔPt (Pa):	Total pressure drop

Xmin (m):	Minimum throw distance in the comfort zone
Xmax (m):	Maximum throw distance in the comfort zone
SPL (dBA)	Sound level

Round Swirl Air Diffuser

ICR – B

45° Curved

Blades for Heating

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ICR-B: Adjustable Blade Round Swirl Diffuser Quick Selection Table

- 45° Curved Blades for Heating

V (m³/h)		Nominal Diameter (mm)				
		315	400	500	630	800
400	ueff. (m/s)	1.9				
	Xmin - Xmax (m)	0.9 - 1.1				
	ΔPt (Pa)	17				
	SPL (dBA)	33				
500	ueff. (m/s)	2.4				
	Xmin - Xmax (m)	1.1 - 1.2				
	ΔPt (Pa)	28				
	SPL (dBA)	41				
600	ueff. (m/s)	2.8	1.7			
	Xmin - Xmax (m)	1.3 - 1.5	1.0 - 1.2			
	ΔPt (Pa)	35	8			
	SPL (dBA)	44	20			
800	ueff. (m/s)	3.8	2.3			
	Xmin - Xmax (m)	1.6 - 1.8	1.3 - 1.5			
	ΔPt (Pa)	49	13			
	SPL (dBA)	51	26			
1000	ueff. (m/s)	2.8	1.7	1.1		
	Xmin - Xmax (m)	1.5 - 1.7	1.3 - 1.5	1.1 - 1.3		
	ΔPt (Pa)	18	14	7		
	SPL (dBA)	32	27	20		
1200	ueff. (m/s)		3.4	2	1.3	
	Xmin - Xmax (m)		1.8 - 2.1	1.5 - 1.8	1.2 - 1.5	
	ΔPt (Pa)		27	20	10	
	SPL (dBA)		39	31	24	
1400	ueff. (m/s)		4	2.4	1.5	0.9
	Xmin - Xmax (m)		2.0 - 2.3	1.7 - 2.0	1.4 - 1.7	1.1 - 1.3
	ΔPt (Pa)		36	25	23	10
	SPL (dBA)		43	36	28	26
1600	ueff. (m/s)		4.5	2.7	1.7	1
	Xmin - Xmax (m)		2.3 - 2.6	1.9 - 2.2	1.6 - 1.8	1.3 - 1.5
	ΔPt (Pa)		43	30	17	14
	SPL (dBA)		46	38	30	29
1800	ueff. (m/s)				1.9	1.2
	Xmin - Xmax (m)				1.7 - 2.0	1.4 - 1.6
	ΔPt (Pa)				20	15
	SPL (dBA)				34	34
2000	ueff. (m/s)				2.2	1.3
	Xmin - Xmax (m)				1.9 - 2.2	1.5 - 1.8
	ΔPt (Pa)				24	19
	SPL (dBA)				38	36
2200	ueff. (m/s)				2.4	1.4
	Xmin - Xmax (m)				2.0 - 2.3	1.6 - 1.9
	ΔPt (Pa)				29	21
	SPL (dBA)				42	40
2400	ueff. (m/s)				2.6	1.5
	Xmin - Xmax (m)				2.1 - 2.5	1.7 - 2.0
	ΔPt (Pa)				34	24
	SPL (dBA)				44	42
2600	ueff. (m/s)				2.8	1.7
	Xmin - Xmax (m)				2.3 - 2.7	1.9 - 2.2
	ΔPt (Pa)				38	30
	SPL (dBA)				45	44
3000	ueff. (m/s)					1.9
	Xmin - Xmax (m)					2.1 - 2.4
	ΔPt (Pa)					38
	SPL (dBA)					51
3400	ueff. (m/s)					2.2
	Xmin - Xmax (m)					2.3 - 2.7
	ΔPt (Pa)					48
	SPL (dBA)					56

Xmin (m): Minimum throw distance in the comfort zone
Xmax (m): Maximum throw distance in the comfort zone
SPL (dBA) Sound level

Aeff (m²):	Effective area
Ueff (m/s):	Effective velocity
V (m³/h):	Air flow rate
ΔPt (Pa):	Total pressure drop

Round Swirl Air Diffuser

ICR – B

60° Curved

Blades for Heating

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Ice Machines & Cooling Systems

ICR-B: Adjustable Blade Round Swirl Diffuser Quick Selection Table

- 60° Curved Blades for Heating

V (m³/h)		Nominal Diameter (mm)				
		315	400	500	630	800
400	ueff. (m/s)	1.9				
	Xmin - Xmax (m)	1.3 - 1.6				
	ΔPt (Pa)	16				
	SPL (dBA)	31				
500	ueff. (m/s)	2.4				
	Xmin - Xmax (m)	1.7 - 2.0				
	ΔPt (Pa)	27				
	SPL (dBA)	40				
600	ueff. (m/s)	2.8	1.7			
	Xmin - Xmax (m)	1.9 - 2.2	1.5 - 1.8			
	ΔPt (Pa)	34	7			
	SPL (dBA)	43	18			
800	ueff. (m/s)	3.8	2.3			
	Xmin - Xmax (m)	2.5 - 2.9	2.0 - 2.3			
	ΔPt (Pa)	44	10			
	SPL (dBA)	47	25			
1000	ueff. (m/s)		2.8	1.7	1.1	
	Xmin - Xmax (m)		2.4 - 2.9	2.0 - 2.4	1.6 - 1.9	
	ΔPt (Pa)		15	10	5	
	SPL (dBA)		31	25	17	
1200	ueff. (m/s)		3.4	2	1.3	
	Xmin - Xmax (m)		3.0 - 3.5	2.5 - 2.9	1.9 - 2.3	
	ΔPt (Pa)		24	16	8	
	SPL (dBA)		38	30	22	
1400	ueff. (m/s)		4	2.4	1.5	
	Xmin - Xmax (m)		3.4 - 3.9	2.8 - 3.2	2.2 - 2.6	1.8 - 2.1
	ΔPt (Pa)		32	22	10	8
	SPL (dBA)		42	34	25	25
1600	ueff. (m/s)		4.5	2.7	1.7	1
	Xmin - Xmax (m)		3.9 - 4.6	3.2 - 3.8	2.5 - 3.0	2.0 - 2.4
	ΔPt (Pa)		39	26	14	11
	SPL (dBA)		45	37	29	30
1800	ueff. (m/s)				1.9	1.2
	Xmin - Xmax (m)				2.8 - 3.3	2.2 - 2.5
	ΔPt (Pa)				16	13
	SPL (dBA)				33	33
2000	ueff. (m/s)				2.2	1.3
	Xmin - Xmax (m)				3.1 - 3.7	2.5 - 2.9
	ΔPt (Pa)				21	16
	SPL (dBA)				37	36
2200	ueff. (m/s)				2.4	1.4
	Xmin - Xmax (m)				3.5 - 4.1	2.6 - 3.1
	ΔPt (Pa)				25	18
	SPL (dBA)				40	39
2400	ueff. (m/s)				2.6	1.5
	Xmin - Xmax (m)				3.8 - 4.4	3.0 - 3.5
	ΔPt (Pa)				30	22
	SPL (dBA)				42	42
2600	ueff. (m/s)				2.8	1.7
	Xmin - Xmax (m)				4.1 - 4.7	3.3 - 3.8
	ΔPt (Pa)				33	26
	SPL (dBA)				44	45
3000	ueff. (m/s)					1.9
	Xmin - Xmax (m)					3.7 - 4.4
	ΔPt (Pa)					35
	SPL (dBA)					49
3400	ueff. (m/s)					2.2
	Xmin - Xmax (m)					4.2 - 5.0
	ΔPt (Pa)					44
	SPL (dBA)					54

Xmin (m): Minimum throw distance in the comfort zone
Xmax (m): Maximum throw distance in the comfort zone
SPL (dBA) Sound level

Aeff (m²):	Effective area
Ueff (m/s):	Effective velocity
V (m³/h):	Air flow rate
ΔPt (Pa):	Total pressure drop

Round Swirl Air Diffuser

ICR – B

Cooling Application

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ICR-B: Adjustable Blade Round Swirl Diffuser Quick Selection Table

- Cooling Application

V (m³/h)		Nominal Diameter (mm)				
		315	400	500	630	800
400	ueff. (m/s)	1.9				
	Xmin - Xmax (m)	1.7 - 4.3				
	ΔPt (Pa)	15				
	SPL (dBA)	31				
500	ueff. (m/s)	2.4				
	Xmin - Xmax (m)	2.1 - 5.4				
	ΔPt (Pa)	26				
	SPL (dBA)	40				
600	ueff. (m/s)	2.8	1.7			
	Xmin - Xmax (m)	2.3 - 6.1	2.3 - 4.6			
	ΔPt (Pa)	33	6			
	SPL (dBA)	43	18			
800	ueff. (m/s)		2.3			
	Xmin - Xmax (m)		2.9 - 5.9			
	ΔPt (Pa)		11			
	SPL (dBA)		25			
1000	ueff. (m/s)		2.8	1.7	1.1	
	Xmin - Xmax (m)		3.7 - 7.5	3.1 - 6.8	2.4 - 6.0	
	ΔPt (Pa)		16	11	5	
	SPL (dBA)		31	25	17	
1200	ueff. (m/s)		3.4	2	1.3	
	Xmin - Xmax (m)		4.7 - 9.6	3.8 - 8.4	2.9 - 7.1	
	ΔPt (Pa)		25	17	8	
	SPL (dBA)		38	30	22	
1400	ueff. (m/s)		4	2.4	1.5	0.9
	Xmin - Xmax (m)		5.4 - 10.7	4.4 - 9.5	3.3 - 8.4	2.9 - 7.1
	ΔPt (Pa)		33	22	10	8
	SPL (dBA)		42	34	25	25
1600	ueff. (m/s)		4.5	2.7	1.7	1
	Xmin - Xmax (m)		6.3 - 12.0	5.0 - 11.0	3.8 - 9.6	3.4 - 8.3
	ΔPt (Pa)		40	27	14	11
	SPL (dBA)		45	37	29	30
1800	ueff. (m/s)				1.9	1.2
	Xmin - Xmax (m)				4.3 - 10.5	3.6 - 8.9
	ΔPt (Pa)				17	13
	SPL (dBA)				33	33
2000	ueff. (m/s)				2.2	1.3
	Xmin - Xmax (m)				4.8 - 11.8	4.1 - 10.0
	ΔPt (Pa)				22	16
	SPL (dBA)				37	36
2200	ueff. (m/s)				2.4	1.4
	Xmin - Xmax (m)				5.3 - 12.8	4.3 - 10.6
	ΔPt (Pa)				26	18
	SPL (dBA)				40	39
2400	ueff. (m/s)				2.6	1.5
	Xmin - Xmax (m)				5.8 - 13.5	4.8 - 11.4
	ΔPt (Pa)				31	22
	SPL (dBA)				42	42
2600	ueff. (m/s)				2.8	1.7
	Xmin - Xmax (m)				6.4 - 14.8	5.4 - 12.8
	ΔPt (Pa)				35	27
	SPL (dBA)				44	45
3000	ueff. (m/s)					1.9
	Xmin - Xmax (m)					6.3 - 14.4
	ΔPt (Pa)					36
	SPL (dBA)					49
3400	ueff. (m/s)					2.2
	Xmin - Xmax (m)					7.1 - 15.5
	ΔPt (Pa)					45
	SPL (dBA)					54

Xmin (m): Minimum throw distance in the comfort zone
Xmax (m): Maximum throw distance in the comfort zone
SPL (dBA) Sound level

Aeff (m²): Effective area
Ueff (m/s): Effective velocity
V (m³/h): Air flow rate
ΔPt (Pa): Total pressure drop