SUBMITTAL

F-18R

Destratification Fan

AIR-ROW

DESCRIPTION

The Air-Row F-18R (Round) is a patented axial destratification fan for open ceilings. This fan is designed to eliminate stratified air layers from ceiling to floor and help deliver 30% energy savings.

MOTOR SPECIFICATIONS

- 92% efficient ECM (Electronically Commutated Motor)
- Built-in thermal overload protector "TOP"
- Soft start feature
- Dual customizable speed levels for decibel sensitivity and air performance
- Ultra-reliable PA plastic fan blade material
- Degree of protection – IP55
- Approval – UL 1004-3, CSA C22.2 No. 77, VDE

HOUSING

- High quality .040 Kynar aluminum (Fan weight – 7 lbs.)
- Unique round design for building aesthetics
- Cross-shaped vanes for proper air distribution
- Open concept design for field serviceability
- 100% recyclable and environmentally friendly

CERTIFICATIONS

- Conforms to UL-507 for safety and electric fans
- ETL listed in USA and Canada
- Intertek 4005010
- U.S. Patented Product

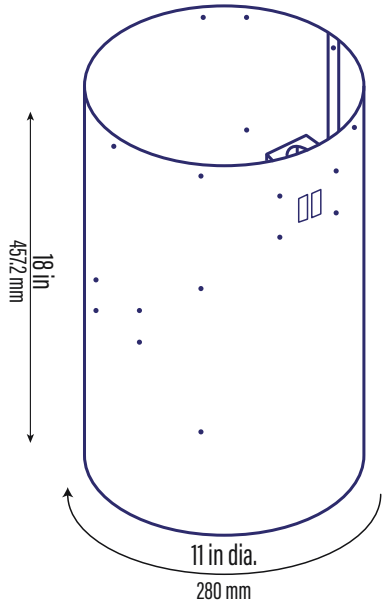
COLOR OPTIONS

- Polar White (standard)
- Black (secondary)

*All products can be professionally matched to any color

WARRANTY

Full 10 year parts and workmanship warranty included from date of purchase



TECHNICAL SPECIFICATIONS

VOLTS	115V
HZ	50/60
WATTS*	23
AMPS	.35
RPM	1500
dBA*	53
MAX HEIGHT	30 FT

*Wattage results were tested @ 1500RPM.
*Sound level pressure was recorded at 10 ft.

FEATURES AND ACCESSORIES

(Additional costs may apply for the following)

- **AR-Adapter** for 0-10VDC Connectivity.
- **AR-Switch** (Wall Control) Dual function fan controller
- **AR-POT** (Wall Potentiometer) for 0-10VDC control
- **Cord & Plug** (115V 3-prong black or white UL listed)
- **Blade Guard** for specific balloon or ball control
- **Tilt Bracket** with multiple angle options. Can be mounted on ceilings or walls for specific air targeting
- **Hanging Kit (Seismic Restraint):** Two 10' safety cables with easy push button mechanisms by Gripple®. Each cable is UL certified with a 33lb weight restriction and a 5:1 safety factor rating

F-18
PERFORMANCE DATA

AIR-ROW

FAN SPECIFICATIONS

Test results for the F-18 Premium Efficiency Destratification Fan

- EBM Pabst ECM Fan
- 120 V 50/60 Hz, 23 Watts, .35 Amps
- 1500 RPM
- Additional metal straightening fins for added throw

DATA TABLE

FAN SPEED	CONTROL SIGNAL (V)	CFM	WATTS
100%	10	575	23
90%	9	518	17
80%	8	460	9
70%	7	403	3
60%	6	345	1
50%	5	288	>1
40%	4	230	>1
30%	3	173	>1
20%	2	115	>1
10%	1	58	>1

TABLE 1: FAN SPEED, VELOCITY, AND COVERAGE

	100% FAN SPEED 575 CFM	80% FAN SPEED 460 CFM	60% FAN SPEED 345 CFM	40% FAN SPEED 230 CFM
HEIGHT	AIR SPEED	AIR SPEED	AIR SPEED	AIR SPEED
10	700	570	433	300
15	472	374	255	185
20	350	215	157	98
25	255	155	98	50
30	177	100	40	

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DETERMINING THE NUMBER OF DESTRATIFICATION FANS

Consider two (2) factors when estimating the number of destratification fans for a building: air-turn-overs per hour (ATOs) and velocity of the air at the floor.

Please follow these steps to determine the number of fans required:

- The first step is to estimate the number of ATOs required to destratify the building. Refer to Table 1 to select the recommended ATO for the type of facility.
- Then, determine the desired air velocity at the floor. It is important to understand how the air velocity will affect the space conditions. Air velocity is how fast the air will move across the skin of the occupant directly underneath the fan. Moving 3-5 feet away from the center of the fan and there will be minimal velocity. Too much air movement could make the occupant uncomfortable. Table 2 lists the recommended velocity for each facility type.

$$\text{Number of Fans} = \frac{\text{Length (ft)} \times \text{Height (ft)} \times \text{Width (ft)}}{(\text{cfm} \times \text{fan speed} \times 60) / \text{ATOs}}$$

The next factor to consider is the layout of fans in the space. The ideal layout of the fans will be to capture the most stratified air and throw it back to the floor. These are the first locations you want to install fans. Below is a list of locations where one can find the most stratified air in a space.

- In front of HVAC equipment delivering hot air into the space. If the HVAC equipment is throwing horizontally take into consideration how much throw is occurring and space fans out accordingly.
- Large industrial equipment
- Refrigeration units in grocery stores or gas stations

Start by laying out the fans to capture the areas with the most stratified air. The remaining fans should be distributed evenly as best as possible based on space constraints and occupant comfort.

TABLE 2: GUIDELINES FOR AIR TURNOVERS PER HOUR FOR DESTRATIFICATION

BUILDING TYPE - LEVEL OF STRATIFICATION	MIN	MAX
LIGHT MANUFACTURING - LOW	0.5	1.5
LIGHT MANUFACTURING - HIGH	0.75	2.25
WAREHOUSE - LOW	0.25	1.25
WAREHOUSE - HIGH	1	2.5
CASINO - LOW	0.5	1.25
CASINO - HIGH	1	2.25
GROCERY - LOW	1	2
GROCERY - HIGH	2	3
AIRCRAFT HANGAR - LOW	0.75	1.5
AIRCRAFT HANGAR - HIGH	1	2.5
AUTO AGENCY SERVICE AREA - LOW	0.5	1.5
AUTO AGENCY SERVICE AREA - HIGH	0.75	2.25
INDOOR SPORTS ARENA - LOW	0.75	1.5
INDOOR SPORTS ARENA - HIGH	1	2.5

TABLE 3: GUIDELINES FOR AIR VELOCITY AT FLOOR LEVEL (FPM)

BUILDING TYPE - LEVEL OF STRATIFICATION	MIN	MAX
LIGHT MANUFACTURING - LOW	150	350
LIGHT MANUFACTURING - HIGH	250	500
WAREHOUSE - LOW	150	350
WAREHOUSE - HIGH	200	500
CASINO - LOW	75	200
CASINO - HIGH	100	250
GROCERY - LOW	150	350
GROCERY - HIGH	200	400
AIRCRAFT HANGAR - LOW	200	400
AIRCRAFT HANGAR - HIGH	300	500
AUTO AGENCY SERVICE AREA - LOW	150	350
AUTO AGENCY SERVICE AREA - HIGH	250	500
INDOOR SPORTS ARENA - LOW	200	400
INDOOR SPORTS ARENA - HIGH	300	500

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EXAMPLE

A warehouse is 100 feet long by 225 feet wide, with a 20-foot-high ceiling. The building is currently heated with steam unit heaters leading to high levels of stratification. Based on Table 2 a 1.5 ATO was selected and based on Table 3 a velocity of 200 fpm was selected.

Using Table 1, the ceiling height of the building (20 feet), and velocity at the floor of 200 fpm the F-18 fan was selected at 80% fan speed. At this fan speed the F-18 will deliver 504 cfm per fan.

$$\text{Number of Units} = \frac{\text{Length (ft) x Height (ft) x Width (ft)}}{\text{(cfm x fan speed x 60) / ATOs}}$$

$$= 100 \times 225 \times 20 / [630\ 80\% \times 60 / 1.5]$$

$$= 22.32$$

The recommended number of F-18 destratification fans is ~22 fans. The total square footage of the building is 22,500 sqft. In this example there are no tall obstructions, and the HVAC system is evenly distributed throughout the space. When drawing the layout for the fans the designer noticed that 22 fans would leave a dead space where there would be no fans. The fan count was increased to 24 to make sure the full space was being destratified. A designer/engineer can change the number of fans, number of ATOs, or the air velocity at the floor based on the layout of the building or occupant comfort.

Note occupant comfort needs to be considered when selecting fan speed and when laying out fans in a space. High air velocity will make the occupants cooler and this could lead them to be uncomfortable. Another consideration is high velocity could blow around objects of little weight like paper. Consider installing fans in locations where the fans are not directly over where occupants could sit or stand for longer periods of time.