

## 2007 Fan Brochure



By applying the laws of aero and fluid dynamics with sound mechanical engineering principles and an inventor's perspective on a simple concept, the ceiling fan; HVLS technology evolved. Now, it is changing the way air flow systems are designed, implemented and managed worldwide. At MacroAir™ we work to build high quality, energy efficient products to enhance the comfort and productivity of people and improve the production and processes of business.

MacroAir's priorities are simple; people and their environment, integrity, quality in workmanship and passion for work and living.

*Walter K. Boyd*

INVENTOR, FOUNDER





## INTRODUCING

### The Whisperfoil XL™ Six Blade

Not since we first introduced HVLS technology in the mid 90s have we been more pleased to offer our customers another industry first. Our new SIX blade design offers unmatched mechanical efficiencies, exceptional air flow for summer cooling, reversibility for winter heat de-stratification and our patent pending Two Part Interlocking Safety System for worry free optimal performance. Plus our in-house manufacturing team pays close attention to every detail to assure you of the highest quality in the industry.

**"The associates are very pleased** with the fans in terms of comfort. From an energy stand point, all I can use is theoretical. We were able to shut down a 5HP fan for each 1HP MacroAir™ fan installed. There are some sensible savings there."

Ed Caswell  
Goodyear Tire and Rubber Company

### Leverage Existing HVAC Systems

HVLS fans are an energy saving asset when incorporated with HVAC systems. They run for pennies an hour and move large air masses without creating turbulence. They reduce thermal loads, electricity use, and mechanical cooling and heating times. Employ fans to run during peak-load times, economizer cycles, or when setback times are scheduled. Incorporate fans into zone program designs to reduce tonnage and in some cases, completely eliminate it. Right size HVAC systems by using MacroAir fans to ensure comfort levels are maintained and energy savings goals are achieved. When designing HVAC systems less duct work and fewer ventilation fans may be required. Thermostat settings can be adjusted higher in summer and lower in winter to yield significant cost savings. Less run time means less system maintenance requirements and extended system life expectancies.

### HVLS Fan Technology

With diameters up to 24 feet, HVLS fans solve air quality problems by circulating large air masses seamlessly. The design, mechanics, and size of HVLS fans yield unique advantages that no other technology can match.

- Highly Energy Efficient
- Full, Encompassing Air Circulation
- Effects Air to Cool, Warm, and Comfort People
- De-stratifies Heat Layers for Winter Comfort
- Promotes Healthier Air Quality
- Outstanding Coverage without Drafts
- Keeps Wet, Moist Areas Dryer
- Decreases Bacteria, Mold, Mildew, Spoilage
- Improves Livestock Comfort, Performance
- Deters Birds, Bugs, Flying Insects
- Reduces Complaints and Liability Issues
- Reduces Heat Stress
- Long Life Mechanical Efficiencies
- Ergonomically Located for Safety

The relationship between speed (rpm), diameter, airfoil shape, and the resultant size and momentum of a fan's air column yields exponential efficiencies. First, an air column with a large area can sustain movement longer by leveraging its own momentum allowing air to entrain, circulate and reach corner to corner. Second, all encompassing circulation diminishes areas of stale, stuffy noxious unhealthy air. By operating at very low rpm, torque and wear are minimized and fan mechanical efficiencies are increased for a longer life cycle. Third, low rpm equates to a highly efficient fan using very little power to operate. They run for pennies an hour! Numerous studies by universities and mechanical efficiency experts agree HVLS fans are the most energy efficient fans available.

### Design Green with MacroAir

Energy efficient cost saving equipment is vital to your business, our economy and our planet. In acknowledgement of HVLS fan efficiencies many state and local energy saving programs offer rebates, grants and loans for HVLS fan procurement and installation. Be sure to check for these kinds of programs in your area.

#### A Simple Example of Energy Savings

36" High Speed Fan or 20' HVLS Fan

36 inch High Speed	24' HVLS Fan
10,000 CFM	275,000 CFM
<b>Fans to Match CFM: 27</b>	<b>to 1</b>
Power: 14.53 kW:	1.59kW
Cost at .09 kWh: 1.31	0.143
Cost for 20,000 hrs: \$26,200	\$2,860
<b>Energy Savings:</b>	<b>\$23,340</b>
Life: 3-5 Years	To 10 +
Rebuildable: NO	YES
Maintenance: YES	LOW - NONE

Changing the way experts design and implement air flow systems worldwide

## Enhance Ventilation Systems

By continuously mixing incoming fresh air with stale processed air the total amount of ventilation required is reduced. No other fan system, or ventilation technology does this better. In many cases, the number of high-speed exhaust fans can be reduced or eliminated all together, which can cut fan power consumption up to 90%!

### Airvolution™ Line

#### Optimizes Comfort for People

Airvolution fans are specifically designed to enhance the comfort of people. A fan's large column of air pushing downward builds a comfortable deep floor jet of air that entrains outward. The depth of the floor jet (wall of moving air) is related to the diameter of the fan. There is no need for speed. Air velocities from 3 to 5 miles an hour optimize the cooling effect of air sweeping across moist skin. Too much air is turbulent and drying, it creates unwanted drafts and higher air velocities can heat the skin instead of cooling it.

### MaxAir™ Line

#### Excels for Agriculture and Special Applications

The MacroAir research and development team determined there is a need for higher air velocities when cooling livestock, or where extreme moisture, bacteria, mold, mildew, and wet conditions such as wet floors exist. In these circumstances higher air velocities equate to higher performance factors and a healthier environment. MaxAir fans are engineered to deliver the optimal air flow for these special conditions.

### Quality, Service and Warranty

Product development and continuous improvement are the hallmarks of MacroAir. Walter Boyd, founder and inventor of HVLS technology and his son, Eddie Boyd, president and ceo, continue to lead the industry with the highest in-house manufacturing and quality control standards.

MacroAir fans are individually matched with engineered control panels to ensure optimal acceleration, speed, longevity and overall efficiency and effectiveness. Fan hubs are lost foam cast and tolerances must be within + or - 10/1,000th of an inch. Our chief engineer works with our manufacturing team and is on the floor daily leading and improving our processes.

Our customer service staff is always available to answer your questions - our goal is to exceed your expectations. To that end, we provide a lifetime limited warranty on blades and hubs, three years on their components, and one year on labor. Our products are built to last and perform year after year.

### What is Your Main Objective?

To improve employee comfort and performance; to provide cooling, heat de-stratification, air mixing and circulation, or diminish fumes and gases, to increase energy efficiency and savings, or to dry; wet floors and control moisture; to improve livestock comfort and performance?

### HVLS Fan Basics for Installation

Here are just a few basic considerations: What is the size of the facility? Ceiling heights should be a minimum of 15 feet. Allow at least 3 feet for clearance, 5 feet is optimal. Allow at least 18 inches for blade clearance; 2 feet or more is preferred. Electrical is 115, 240, 480 volt; single or three phase.



Create a healthier, more comfortable, and productive environment. Select models with six or ten blades and diameters from 8' - 20' and 24'. Fans are ergonomically located for a safer, clutter-free work area.

### HVLS Fan Sizes and Ratings

#### We Custom Build

Standard sizes are in 2' increments from 8' to 20'. Our largest fan is 24' in diameter. All ceiling fans include mounting hardware that can be clamped to support beams. Underwriter Laboratories (UL) listed fans are available. Contact us for your special application requirements.

### HVLS Fan Finishes and Colors

#### Blades Anodized Protected

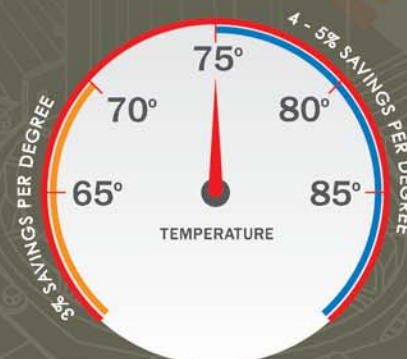
MacroAir standard blades are anodized, extruded 6063-T351 aluminum. Anodizing protects blade surfaces for durability, higher performance, easier cleaning, and a longer life. Hubs are cast aluminum with a standard black cover. We also offer beautiful custom colors and faux wood finishes. Architects and designers please contact us with your specifications.

### 100,000 Sq Ft., Facility?

For a typical layout 5 to 10 fans will provide optimal air flow and coverage; however, each facility is different. So, please, ask us! We have an exceptional, experienced technical sales staff trained to assess your needs and discuss your requirements.

### Save 3 - 5% per Degree

Arizona State University cut their annual electricity bill by 6.2% with a 1° F thermostat adjustment. Ref., [asu.edu/fm/energyutilization.htm](http://asu.edu/fm/energyutilization.htm)



Adjust  
Thermostat  
For Savings

# Diameters and Specifications

MacroAir HVLS Fan Specifications @ 60 Hz (Additional sizes are available) Note, the 24' and 20' WFXL fans are available with ten blades.

Fans Feature MacroAir's 6 Blade Design and Our High Performance WhisperFoil XL™ Blade	24' MaxAir™	20' MaxAir™	20' Airvolution™	18' MaxAir™ (70Hz)	18' Airvolution™	16' Airvolution™	14' Airvolution™	12' Airvolution™	10' Airvolution™	8' Airvolution™
Displacement CFM	275,000	177,000	151,000	153,000	128,000	114,000	96,000	79,000	53,000	40,000
Max. Effective Area Sq. Ft *	20,000	15,000	15,000	15,000	15,000	15,000	8,000	7,000	5,000	4,000
Max. Effective Diameter FT*	160	140	140	140	140	140	100	95	85	75
Typ. Industrial Spacing FT**	90	80	80	80	80	80	60	55	50	45
Maximum RPM	65	73	60	85	71	87	104	119	143	206
Power Consumption KW***	1.59kW	1.25kW	.576kW	1.25kW	.687kW	.689kW	.697kW	.678kW	.597kW	.554kW
Motor Horsepower	2	1.5	1	1.5	1	1	1	1	1	1

\* Maximum Effective Area and Maximum Effective Diameters are determined within a circular area on an unobstructed floor under the fan. The perimeter of the circle is where the average air velocity measured at 40" above the floor, drops below 40 ft/min.

\*\* Typical Industrial Spacing is measured from center to center of range for most industrial applications; the more floor congestion the closer the spacing.

\*\*\* Power Consumption (kW); This is the average power consumption of the fan at 59°F and 29.92 in/Hg atmospheric pressure, in dry air. Lower air density due to high altitude, high temperature, or high humidity will reduce the power consumption for greater energy savings. Convection currents and entrainment in closed areas will typically reduce power consumption. However, fans in open-sided free-stall barns or around large open doors or loading docks may consume more power if left on in windy conditions.

As part of our ongoing product improvement practices, MacroAir reserves the right to change specifications and design without notice.



"MacroAir fans provide much needed air flow and cooling to help keep our employees cool during the hot weather.

**I recommend them highly!"**

Mike Fenex  
Biscomerica



**We Move Air™**

For additional information contact our Technical Sales Staff today.

(886) MoveAir (1-866-668-3247)

info@macro-air.com · www.macro-air.com



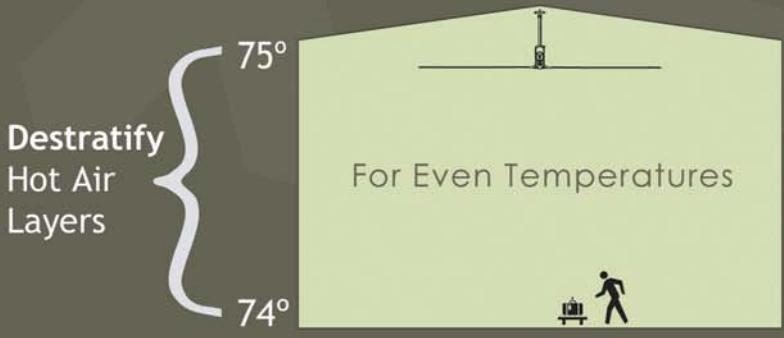
UL LISTED FANS ARE AVAILABLE

CITY	HEATING DD	HEAT COST	SAVINGS Calc., at a conservative 20%	PAYBACK	ANNUAL ROI	5 YEAR ROI	5 YEAR NPV
Minneapolis, MN	8250	\$17,396	\$3,479	1.58	63%	266%	\$9,581
Milwaukee, WI	7470	\$15,992	\$3,198	1.72	58%	245%	\$8,465
Chicago, IL	6600	\$13,440	\$2,688	2.05	49%	206%	\$6,437
Albany, NY	6900	\$14,936	\$2,987	1.84	54%	229%	\$7,626
Detroit, MI	6290	\$13,486	\$2,697	2.04	49%	207%	\$6,473
Omaha, NE	6290	\$13,354	\$2,671	2.06	49%	205%	\$6,368
Cleveland, OH	6200	\$13,293	\$2,659	2.07	48%	204%	\$6,320
Denver, CO	6150	\$13,186	\$2,637	2.09	48%	202%	\$6,234
Pittsburgh, PA	5960	\$12,708	\$2,542	2.16	46%	195%	\$5,855
Boise, ID	5830	\$12,496	\$2,499	2.20	45%	191%	\$5,687
Columbus, OH	5670	\$11,956	\$2,391	2.30	43%	183%	\$5,257
Carson City, NV	5753	\$12,543	\$2,509	2.19	46%	192%	\$5,724
Boston, MA	5630	\$11,990	\$2,398	2.29	44%	184%	\$5,285
Philadelphia, PA	5180	\$11,074	\$2,215	2.48	40%	170%	\$4,556
NYC	5200	\$11,110	\$2,222	2.48	40%	170%	\$4,585
Seattle, WA	5190	\$11,115	\$2,223	2.47	40%	170%	\$4,589
St. Louis, MO	4900	\$10,290	\$2,058	2.67	37%	158%	\$3,933
Cincinnati, OH	4830	\$10,531	\$2,106	2.61	38%	161%	\$4,125
Kansas City, MO	4750	\$10,085	\$2,017	2.73	37%	154%	\$3,770
Newark, NJ	4900	\$10,464	\$2,093	2.63	38%	160%	\$4,071
Baltimore, MD	4680	\$9,969	\$1,994	2.76	36%	153%	\$3,678
Portland, OR	4635	\$9,869	\$1,974	2.79	36%	151%	\$3,598
Oklahoma City, OK	3700	\$7,369	\$1,474	3.73	27%	113%	\$1,611
Reno, NV	6150	\$12,529	\$2,506	2.04	46%	207%	\$5,712
Norfolk, VA	3440	\$7,220	\$1,444	3.81	26%	111%	\$1,493
Little Rock, AR	3170	\$5,397	\$1,079	5.10	20%	83%	\$44
Greensboro, NC	3810	\$8,307	\$1,661	3.31	30%	127%	\$2,357
Memphis, TN	3210	\$6,892	\$1,378	3.99	25%	106%	\$1,232
Oakland, CA	2940	\$6,410	\$1,282	4.29	23%	98%	\$849

Using readily available ASHRAE data on city-specific heating degree days (HDD) and based on current natural gas cost estimates per BTU (\$10.00 per MCF), and conservative facility design criteria; we calculated annual savings, annual and 5 year return on investment (ROI) and 5 year net present value (NPV) of the investment assuming an installed cost per fan of \$5,500 and an annual interest rate of 6%. We assumed no increase in energy costs over the 5 year period (so you know your actual results could be much better). Actual installed fan costs per 20,000 square feet of facility space may vary depending on quantity purchased, regional and site-specific installation costs, and air movement challenges and objectives. A ceiling height of 20 FT was used in these calculations. Best results for indoor applications will be achieved with our energy efficient 20' and 24' MacroAir HVLS fans having Whisperfoil XL™ blades, 1 hp motors, variable fan speed, and reverse capability.

**"The fans are awesome.**  
They really do the trick for us. In the summer, we use the fans along with the swamp coolers to keep the conditioned cool air circulating for improved employee comfort. **In the winter, as heat rises the fans redistribute the warm air back down to the floor.** The fans work great and keep the warehouse comfortable in all seasons."  
Keith Almryde  
Ashworth Inc.

- ### Applications
- For MacroAir HVLS Fan Systems
- A few examples where fans help businesses succeed.
- » Manufacturing, Production & Assembly Facilities
  - » Warehouse & Distribution Centers
  - » Automotive & Truck Repair Garages
  - » "Big Box" Retail Stores
  - » Aircraft Hangers
  - » Produce Packing Sheds
  - » Livestock Pens
  - » Freestall & other Barns
  - » Shopping Malls
  - » Auditoriums
  - » Sports Arenas
  - » Gymnasiums
  - » Tents



REVERSE FANS IN **Winter**  
for Improved Comfort and Productivity.  
Reduce Fan Speed to Yield Even Greater  
**Energy Savings**  
with MacroAir™ HVLS Fans

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## In-House Manufacturing

### Means Quality, Value, and Flexibility

MacroAir pays close attention to every production detail in the manufacture of our fans. Our in-house manufacturing operation allows for complete control of our processes, scheduling, and delivery. The close proximity between design, engineering, shop, procurement, and quality control yields manufacturing economies that result in savings advantages that we pass along to our customers. We take pride in our position as the creator of HVLS technology and we continue to lead the industry with innovative designs, quality engineering, manufacturing and outstanding customer support.

## Power Units

Specifically tailored 1HP to 2HP motors with Class F insulation are inverter ready. Helical gear reducers provide reliable operation, are quiet, vibration-free, and ensure long life. MacroAir's design and engineering expertise carefully matches motors, VFD drives, control units, and blade lengths to ensure optimum balance, performance and efficiency.

## Controllers

Proprietary control panel designs feature Variable Frequency Drives (VFDs). Variable speed control allows a gentle ramp-up and ability to adjust speed for different conditions. Built-in overload protectors and line reactors protect motors from voltage spikes.

## Hubs

Unique – made of aluminum alloy using "lost-foam" casting process to ensure tolerance control within + or – 10/1,000th of an inch, for precision engineering, ease of assembly, and balance.

## Blades

MacroAir offers two airfoil blade designs; the Wickerbill airfoil and the Whisperfoil XL both made from anodized extruded aluminum for long life and easy maintenance.



## Safety Engineering

MacroAir raises the bar and sets the industry standard for product safety engineering. Our new six blade airfoil fans feature our latest patent pending Two Part Interlocking Safety System. MacroAir's ten blade airfoils feature our patented L-shaped Safety Clips and Links.

Each of these systems are designed and engineered to prevent the hub and blades from falling from the fan unit in the unlikely event of the shaft breaking. Plus the safety system prevents the blades from falling separately or together. Additionally, collet-type friction bushings allow controlled slippage in the event of failure.



WhisperFoil XL™ Blade

Our research, development and testing for the best performing and efficient airfoil shape led us to the decision to make the Whisperfoil XL our premiere blade. The performance is exactly what we wanted in an airfoil. By incorporating this blade with our six blade design, we offer the best fan in the industry at an exceptional value.

## Mounting System

MacroAir's innovative Universal Mounting System completely isolates the rest of the fan unit and all its components from the facility structure. The system prevents any vibration or movement from being transferred back into the structure. The system is easy to install and adaptable to most mounting situations.

## Guying System

MacroAir incorporates guying into our mounting system for one important reason; guying reduces the isolated load on the center mount and ceiling truss reducing the chance of damaging the building structure. If guying can preclude roof or structural damage sometime in the future, then it is worth it.

### The Container Store

Keeps Employees Comfortable! Their major Distribution Center was recognized as "Warehouse of the Month" in a 2004 issue of Modern Material Handling magazine ... This DC boasts many amenities, including 60 MacroAir HVLS fans to keep employees cool... This DC is unlike any other – a testament to the reason why they've secured a spot on FORTUNE magazine's annual list of "100 Best Companies to Work For In America."

Ref., [werc.org/AboutWERCCalendar](http://werc.org/AboutWERCCalendar)



We Move Air™

(886) MoveAir (1-866-668-3247)

[info@macro-air.com](mailto:info@macro-air.com) · [www.macro-air.com](http://www.macro-air.com)